

DIPLOMA (COMPUTER SCIENCE) – PART THREE

Optional Early Certificate :- Basics of Technology

Syllabus:-

Sr. No.	Module Code	Name of Module	Credits	Total Marks
1	CS04-11	English-II	4	100
2	CS04-12	Applied Mathematics-II	5	100
3	CS04-13	Introduction to Programming & C	5	100
4	CS04-14	System Analysis & Design	5	100
5	CS04-15	Computer Networks	5	100

Module Name: English-II

- Functional Grammar:** Articles, Preposition, Tenses: Functions, Synthesis, Transformation, Spotting errors and correction of sentences.
- Pre- Requisites of Technical written Communication:** One word substitution, Spelling rules, Words often confused & misused, Phrases.
- The Structure of sentences/ clauses:** Adverb clause, Adjective clause, Noun clause. Sentences: Simple, Double, Multiple and complex, Transformation of sentences: simple to complex & vice versa, simple to compound & vice-versa, Interrogative to assertive & to negative & vice-versa.
- Technical Communication:** Nature, Origin and Development, Salient features, Scope & Significance, Forms of Technical Communication, Difference between Technical Communication & General writing, Objective Style vs. Literary Composition.

Module Name: Applied Mathematics-II

- Complex Numbers:** Complex Numbers, phasor and Application of Complex Number in R.L.C. Circuits.
- Differential Calculus:** Functions and Limits, Differentiation, Approximation of Errors by Differentials.
- Integral Calculus:** Indefinite Integral, Definite Integrals, Area Bounded by a Curve and Axes, Average Value and Root Mean Square Value of a function, Finite Differences and Numerical.

- 4. Partial Differentiation:** Partial Differentiation.
- 5. Solution of Ordinary Differential Equations:** Differential Equations, Linear Differential Equations, Applications of Differential Equations to R-L-C Electric Circuits.

Module Name: Introduction to Programming & C

Unit-I

- 1. Introduction to computer system:** Introduction, Characteristics of computer, Drawbacks of computers, Generations of Computers
- 2. Computer Organization:** Architecture of Computer System
- 3. Number System:** Introduction, Commonly Used Number System, Decimal, Binary, Octal, Hexadecimal, Converting from one number system to another
- 4. Binary Arithmetic:** Introduction, Binary Addition, Subtraction, Multiplication, Division, Representations of characters, BCD Code, EBCDIC, ASCII, Fixed Point Representation, Floating Point Representation
- 5. Algorithms and Flowchart:** Algorithms, Characteristics of algorithms, Flowchart, Different Symbols used in Flowcharts.
- 6. Computer Languages:** Machine Language, Advantages of Machine Language, Disadvantages of Machine Language, High Level Language, Assembly Language, Software, Type of Software, System Software, Application Software
- 7. Input-output Devices:** Introduction, Offline Input Devices, Online Input Devices, Punched Cards, Keyboards, Mouse, Touch Pad, Light Pen, Scanner
- 8. Storage Devices:** Introduction, Primary Memory, RAM, DRAM, ROM, PROM, EPROM, Cache Memory, Secondary Memory, Magnetic Tape, floppy, Hard Disk, CD-ROM
- 9. Operating System:** Introduction, Type of Operating System, Batch Processing Operating System, Single-user Operating System, Multi-User Operating System, Multi-Processing Operating System, Real Time Operating System, DOS, Functions of DOS
- 10. Viruses:** Introduction, Types of Viruses, Antivirus

Unit-II

- 1. An introduction to C:** History of C, Feature of C, Structure of a C program, Variables and Data Types, Arithmetic Expressions
- 2. Components of C Language:** Character Set, C token, Data Type in C, Operators, Type Casting, Data Conversion
- 3. Input / Output Functions:** Formatted Input / Output functions, The print function, The scanf Function, Unformatted Input / Output Function, Character Input / Output Function, String Input / Output Functions

4. **Conditional Statement:** Introduction, If-else statement, Nesting If-else Statement, The switch Statement
5. **Looping:** Introduction, While Loop, Do While Loop, Nesting Loop, The Break Statement, The Continous Statement
6. **Arrays in C:** Array, Two Dimensional Arrays, Passing Array as Parameters, String, Some Library Function for String Handling
7. **Function:** Modular Programming, Top-Down Approach, Structured Programming, function with no Argument and no Return Value, Function Prototype, Storage class in C, Declaring Variables of Specified Storage Classes, Local and Global Variables.
8. **Pointer in C:** Pointer, Passing Pointers as Parameters, Dynamic Memory Allocation, Pointer to Pointer, Pointer to Function.
9. **Structure and Union:** Structure, Array of Structure, Pointer to Structure, Nested Structure, Structure and Function, Difference between Structure and Union.
10. **File Handling in C:** Introduction, Difference between Text and Binary File, Basic File Handling Functions, File Input / Output.
11. **Preprocessor:** Introduction, Functions of a C Preprocessor.

Module Name: System Analysis and Design

Unit-I

1. **System Definition and Concepts:** General Theory systems, Manual and automated systems, Real- life business Sub - Systems. System environment and boundaries. Real - time and distributed systems. Basic principles of successful systems. Approach to system development: Structure system analysis and design, Prototype, Joint application development.
2. **System Analyst:** Role and need of system analyst. Qualifications and responsibilities. System analysis as a profession.
3. **System Development Cycle:** Introduction to Systems Development Life cycle (SDLS). Various phases of SDLS: Study, Analysis, Design, Development, Implementation, Maintenance.
4. **Systems documentation consideration:** Principles of systems documentation, types of documentation and their importance, enforcing documentation discipline in an organization.
5. **System Planning:** Data and fact gathering techniques: Interviews, group Communication - questionnaires, Presentations and visits. Assessing project feasibility: Technical, Operational, Economic, Cost benefits analysis, Schedule, Legal and contractual, Political. Modern methods for determining system requirement: joint application, Development program, prototyping, Business Process re-engineering. System selection plan and proposal.
6. **Modular and Structured Design:** module specifications. Top-down and bottom-up design. Module coupling and cohesion. Structure charts.

7. **System Design and Modeling** : Process modeling , Logical and Physical design Conceptual Data modeling Entity- relationship analysis, Entity -relationship modeling, ERDs and DFDs, Concepts of normalization. Process description: Structured English, Decision tree, Decision tables. Documentation: Data dictionary, Recording data
8. **Input and Output:** Classification of forms, Input/output forms design. User-interface design, Graphical interfaces. Standards and guideline for GUI design. Designing physical files and databases: Designing field, Designing physical record, Designing Physical files, Designing database. Introduction to CASE tools, Feature, Advantages and Limitations of CASE tools, Awareness about some commercial CASE tools.
9. **System Implementation and Maintenance:** Planning consideration Conversion methods, Procedures and Controls. System acceptance criteria. System evaluation and performance. Testing and Validation. Preparing user manual .Maintenance activities and issues.
10. **Computer System Audit and Security:** Audit of Computer system usage. Types of threats to computer system control measures: Threat and risk analysis, Disaster recovery and contingency planning, viruses.
11. **OO Analysis/ Design:** Introduction to UML OO development life cycle and modeling .Static and dynamic modeling. Comparison of OO and module-oriented approach. Modeling using UML.
12. **Introduction to Management Information System (MIS)** : Meaning and role of MIS. System approach to MIS. Types of information systems: Transaction processing system, Management information system Decision support system, Expert system case studies (Illustrative) : MIS for accounting and function, MIS for marketing system.

Module Name: Computer Network

1. **Introduction to Computer Networks:** Introduction, User of Networks: Goals and applications, OSI Reference Mode, Novell Netware, ARPANET, NSFNET, The Internet.
2. **The Physical Layer:** Transmission media, Twisted Pair, Baseband and Broadband Coaxial Cable, Fiber Optics, Wireless Transmission, Radio Transmission, Microwave Transmission, Infrared Transmission, Light Wave Transmission, ISDN Services, Virtual Circuits verses Circuit Switching, Transmission in ATM Network, Paging System, Cordless Telephone, Cellular Telephone, Communication Satellite.
3. **The Data Link Layer:** The data link Layer, Framing , Error Control, Flow- Control, Error Detection and Correction Protocols, Simplex Stop and Wait Protocols, One Bit sliding Window, Using Go- Back n, the Data link layer in the internet.
4. **The Medium Access Sub – Layer:** The Medium Access Sub Layer , Framing Static and Dynamic Channel Allocation in LAN and MANs ,IEEE standard 802.3 and Ethernet, IEEE standard 802.4 and Token Bus, IEEE 802.4 and Token Ring; Bridges, Bridges form 802x to 802y, Transparent Bridges, Source Routing Bridges.
5. **The Network Layer:** The network layer , network layer Design Issues, shortest Path routing, Flooding, Flow Based Routing , Broadcast Routing, Congestion Control and Prevention Policies, Internet

Working, Connectionless Internet Working , Tunneling Internet Work Routing, Fragmentation, Firewalls, IP Address Internet Control Protocols.

6. The Transportation Layer: The transportation Layer, The Transport Service, Transport Protocols, Addressing,, Establishing a Connection, Releasing a Connection, The Internet Transport Protocols, TCP.

7. The Application Layer: The Application layer, Network Security, Electronic mail, working of e-mail.