

KUMAUN UNIVERSITY, NAINITAL
DEPARTMENT OF INFORMATION TECHNOLOGY

SEMESTER-I (2019 onwards)

Note: - 1. Semester system will be adopted for PGDCA. The course duration will be of two semesters.

2. The program will be regulated as per new professional /self finance program ordinances from the session 2018-19.

3. Question paper pattern will be adopted as per directions from University.

Scheme and syllabus for PGDCA)

SEMESTER-I	Practical	Internal	External	Total
PAPER I-FUNDAMENTALS OF COMPUTER & IT	-	30	70	100
PAPER II- DIGITAL ELECTRONICS	-	30	70	100
PAPER III-WEB TECHNOLOGIES	-	30	70	100
Paper IV- PROGRAMMING THROUGH 'C'	-	30	70	100
Practical Examination based on paper II and III	100			
TOTAL MARKS: 500				
SEMESTER -II				
PAPER I- SOFTWARE ENGINEERING	-	30	70	100
PAPER II- OPERATING SYSTEM	-	30	70	100
PAPER III- DATABASE MANAGEMENT SYSTEMS	-	30	70	100
Paper IV-DATA STRUCTURE AND ALGORITHMS	-	30	70	100
Practical Examination based on paper II I and IV	100			
TOTAL MARKS: 500				
Total of two semesters will be out of 1000 marks				

FUNDAMENTALS OF COMPUTER & IT

PAPER I

Max. Marks – 100 External -70; Internal - 30 Duration – 3 hrs

Information concept and processing system: Evolution of information processing, data, information language and communication.

Elements of computer processing system: Hardware-CPU, storage devices and media, VDU, input-output devices, data communication equipment, Software-system software, application software.

Programming Language: Classification, machine code, assembly language, higher level languages and fourth generation languages

Operating systems: Concept as a resource manager processor, devices and memory. Concept of Priorities, projection and parallelism. Command interpreter Typical commands of DOS/UNIX/Net Ware, GUI-Windows.

Computer and Communications: Single user, multi-user, work station, client server systems, Computer networks, network protocols, LAN, WAN, Internet facilities through WWW, Mosaic, Gopher, HTML, elements of java.

Information integrity definite: Ensuring integrity, computer security, perverse software, concepts and components of security. Preventive measures and treatment.

Range of application: Scientific, business, educational, industrial, national level weather forecasting, remote sensing, planning, multilingual applications.

Introduction to OOPS: Need of object oriented programming, Classes an objects, Data hiding, Data encapsulation, operators overloading, function overloading, inheritance and polymorphism.

References:

1. Sanders, D.H. "Computers Today", McGraw Hill, 1998.
2. V.K. Jain "O-Level Module"
3. E.Balagurswamy, "Object Oriented Programming using C++".

Digital Electronics

Paper II

Max. Marks – 100 (External -70; Internal -30) Duration – 3 hrs

1. Logic Gates (AND, OR, NOT, EXOR, NAND, NOR).
2. Boolean Algebra: Simplification by 4 Variable K-Map Method, Logic Implementation using Gates, Multiplexers, Decoders
3. Binary/BCD Subtraction and Addition Adder, subtractors, 7 segment LED display. Characteristics of Digital IC's, TTL and MOS Implementations, Representative Circuits and Comparison, Propagation delays, Fan-in/Fan-out, Tristate buffers.
4. Flip-flops (SR, JK,D,T), Shift Registers, Counters (Synchronous and Asynchronous), Ring Counter, ROM and RAM Cells and Organizations;
5. D/A and A/D converters.

Reference:

1. R.P. Jain., "Modern Digital Electronics".
2. Taub and Schilling., "Digital Integrated Electronics".

Web technologies

Paper III

Unit 1- Internet and the World Wide Web:

What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. Search engine, web server – apache, IIS, proxy server, HTTP protocol

Unit2-

Introduction to HTML : Information Files Creation; Web Server; Web Client/Browser (Understanding how a Browser communicates with a Web Server); Hyper Text Markup Language (HTML) (HTML Tags, Paired Tags); Commonly used HTML Commands (The structure of an HTML program, Document Head, Document Body); Titles and Footers; Text Formatting (Paragraph Breaks, Line Breaks); Emphasizing Material in a Web Page (Heading Styles, Drawing Lines); Text Styles (Bold, Italics, Underline); Other Text Effects (Centering (Text, Images etc.); Spacing (Indenting Text)).Lists: Types of Lists (Unordered List (Bullets), Ordered Lists (Numbering), Definition. Adding Graphics to HTML Documents: Using the Border attribute; using the Width and Height Attribute; Using the Align Attribute; Using the ALT Attribute.

Unit 3-

Tables : Introduction (Header, Data rows, The Caption Tag); Using the Width and Border Attribute; Using the Cell padding Attribute; Using the Cell spacing Attribute; Using the BGCOLOR Attribute; Using the COLSPAN and ROWSPAN Attributes. Linking Documents: Links (External Document References, Internal Document References); Images as Hyperlinks (Image Maps).Frames: Introduction to Frames: The<FRAMESET> tag, The <FRAME> tag, Targeting Named Frames. DHTML: Cascading style sheets, Style tag.

Unit 4-

Introduction to JavaScript: JavaScript in Web Pages (Netscape and JavaScript, Database Connectivity, Client side JavaScript, Capturing User Input); The Advantages of JavaScript (An Interpreted Language, Embedded within HTML, Minimal Syntax -

Unit 5-

Easy to Learn, Quick Development, Designed for Simple, Small Programs, Performance, Procedural Capabilities, Designed for Programming User Events, Easy Debugging and Testing, Platform Independence/Architecture Neutral); Writing JavaScript into HTML;

Unit 6-

Forms Used by a Web Site: The Form Object; The Form Object's Methods (The Text Element, The Password Element, The Button Element, The Submit (Button) Element, The Reset (Button) Element, The Checkbox Element, The Radio Element, The Text Area Element, The Select and Option Element, The Multi Choice Select Lists Element); Other Built-In Objects in JavaScript (The String Object, The Math Object, The Date Object); User Defined Objects (Creating a User Defined Object, Instances, Objects within Objects).

PROGRAMMING THROUGH 'C'

Paper IV

Unit-I C-Fundamentals:

Character set, Identifiers and keywords, Data types, Constants, Variables and Arrays, Declarations, Operator and Expressions, Library functions, Statements, Symbolic constants, Preprocessor directives, Formatted input, Output, Basic data types, Type conversion, Data type modifiers, Expressions and Operators, Precedence of c operators.

Unit- II Control Structures:

Introduction, Decision making with if – statement, if-else and nested if, while and do-while, for loop. Jump statements: break, continue, Go To, switch Statement

Unit III Functions & Arrays:

Introduction to Functions, Function Declaration, Function Categories, Standard Functions, Parameters and Parameter Passing, Call – by value/reference, Recursion, Global and Local Variables, Storage classes.

Arrays: Introduction to Arrays, Array Declaration, Single and Multidimensional Array,

Unit-IV Structure and Union:

Declaration of structure, Accessing structure members, Structure Initialization, Arrays of structure, nested structures, Unions.

Unit-V Pointers:

Introduction to Pointers, Address operator and pointers, Declaring and Initializing pointers, Assignment through pointers, Pointers and Arrays

Suggested Books:

1. Let us C, Yashvant P Kanetkar, Seventh Edition, BPB Publications, New Delhi.
2. Programming in ANSI C, E. Balagurusami, Fourth Edition, Tata McGraw Hill
3. Programming in C, Byron S. Gottfried, Second Edition, McGraw Hills.
4. The C Programming Language, Kernighan & Ritchie, Second Edition, PHI Publication
5. Object Oriented Programming, Lafore R, Third Edition, Galgotia Publications
6. Problem Solving and Programming in C, R. S. Salaria, Second Edition

Semester II
Software engineering
PAPER I

Unit 1

Software: Characteristics, Components, Applications, And Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics & Measurements.

Unit 2

S/W Project Planning: Objectives, Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models: COCOMO Model, The S/W Equation, System Analysis: Principles of Structured Analysis, Requirement analysis, DFD, Entity Relationship diagram, Data dictionary.

Unit 3

S/W Design: Objectives, Principles, Concepts, Design methodologies: Data design, Architectural Design, procedural design, Object -oriented concepts

Unit 4

Testing fundamentals: Objectives, principles, testability, Test cases: White box & Black box testing, Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing.

Suggested Readings/ Books:

1. Roger. S. Pressman, Software Engineering - A Practitioner's Approach, 7th Edition, McGraw Hill, 2010.
2. Rajib Mall, "Fundamental of Software Engineering ", 3rd edition, PHI, 2009.
3. Naseeb Singh Gill, "Software Engineering: Software reliability, testing and quality, Khanna Book Publishing, 2011.

Semester II
Operating System

PAPER II

Unit 1

INTRODUCTION: - Machine Hardware (Traps and Interrupts, Multimode Execution), Operating System Structure (Operating System Types, Operating System Kernel, the Boot Process).

PROCESS MANAGEMENT :- Process Scheduling, Process State, Scheduling Criteria, Scheduling Algorithms (First-Come First-Served, Shortest Job First, Shortest Remaining Time, Round Robin, Priority, Multilevel feedback Queues)

Unit 2

INTERPROCESS COMMUNICATION AND SYNCHRONIZATION: - Interprocess Communication, Process Synchronization (Critical Section, Interrupt Disabling, Test and Set Instruction, Write a Program Instruction, Wait and Signal, Semaphores) Deadlock (Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock).

Unit 3

MEMORY MANAGEMENT: - Single Absolute Partition, Single Relocatable Partition, Multiprogramming, and Multiple Partitions (Multiple Fixed Partitions, Multiple Variable Partitions (Partition Selection Algorithms), Paging and segmentation. VIRTUAL MEMORY: - Demand Paging (Locality of Reference, Page Locking, Page Size, Page

Replacement Algorithms, Algorithm Performance, Allocation Policies, Working Set),

Unit4

FILE SYSTEM MANAGEMENT: - Directories and Names (Partitions, Per-Process Root Directory, Directory

Structure, Directory Entries), Types of File System Objects, File System Functions, Information

Types, File System Architecture (Access Methods, Access Control, File Locking, Blocking, Allocation, Free Space).

Suggested Readings/ Books:

1. William Stalling, "Operating System Internals and Design Principle", edition 6th, Pearson Education India, 2009.

2. Peter bears Galvin, "Operating System Principle", Edition 7th, Wiley India,2009

3. J.Harris,"Operating System SCHAUM'S OUTLINE", Special Indian edition,
Tata McGraw Hill. 2008

4. Pramod Chandra," An Introduction to Operating System", Edition 3rd, PH, 2010.

Semester II

PAPER III- DATABASE MANAGEMENT SYSTEMS

PAPER I- Data base Management Systems

Unit 1

An overview of DBMS: Concept of File Processing Systems and database systems, Database Administrator and his responsibilities. Physical and Logical data independence. Three level Architecture of Database System: the external level, conceptual level and the internal level.

Unit 2

Introduction to Data Models: Entity Relationship Model, Hierarchical, Network and Relational Model. Comparison of Network, Hierarchical and Relational Model.

Unit 3

Relational data Model: Relational database, relational algebra and calculus, SQL dependencies, functional dependency, multi-valued dependency and join, normalization.

Unit 4

Database protection: Recovery, Concurrency Management, Database Security, Integrity and Control, Disaster Management

Unit 5

Distributed databases: Structure of a distributed database, design of distributed databases.

Suggested Books-

1. "An Introduction to Database System", Bipin C. Desai, Galgotia Publications.
2. "An Introduction to Data Base Systems", C.J. Date, Eighth Edition, Narosa Publications.
3. "Database System Concepts", Henry F. Korth, Fifth Edition, McGraw Hill.
4. "Introduction to Database Management", Naveen Prakash, TMH
5. "Principles of Database Systems", Ullman, Second Edition, Galgotia Publications.
6. "Database Systems: Design, Implementation, and Management", Rob Coronel, Ninth Edition

Semester II

Paper IV-DATA STRUCTURE AND ALGORITHMS

Unit – 1: Data Structures Basics: Structure and Problem Solving, Data structures, Data structure Operations, Algorithm: complexity, Time- space tradeoff.

Unit – 2: Linked List: Introduction, Linked lists, Representation of linked lists in Memory, Traversing a linked list, Searching a linked list, Memory allocation and Garbage collection, insertion into linked list, Deletion from a linked list, Types of linked list.

Unit – 3: Stack and Queue: Introduction, Array Representation of Stack, Linked List Representation of stack, Application of stack, Queue, Array Representation of Queue, Linked List Representation of Queue.

Unit – 4: Trees: Definitions and Concepts, Operations on Binary Trees, Representation of binary tree, Conversion of General Trees to Binary Trees, Sequential and Other Representations of Trees, Tree Traversal.

Unit –5: Graphs: Matrix Representation of Graphs, List Structures, Other Representations of Graphs, Breadth First Search, Depth First Search, Spanning Trees.

Books and references:-

1. Introduction to Algorithms

Book by Charles E. Leiserson, Clifford Stein, Ronald Rivest, and Thomas H. Cormen

2. Algorithms + Data Structures = Programs Book by Niklaus Wirth

3. Algorithms in C++ Book by Robert Sedgewick

4. Data Structures and Algorithms Made Easy : Data Structure and Algorithmic ...

Book by Narasimha Karumanchi