Syllabus for Undergraguate Programme

B. Sc. In Computer Science

Manipur University,

CanchipurImphal-795003

	FIRST YEAR		
	CODE NO.	PAPER NAME	TOTAL MARKS
1st Semester	CS 101	IT TOOLS & APPLICATIONS	60
	CS10	PRACTICAL	40
2nd Semester	CS202	PROBLEM SOLVING TECHIQUES &	60
			40
		SECOND YEAR	
	COD E	PAPER NAME	TOTAL MARKS
3rd Semester	CS 303	DIGITAL COMPUTER	60
	CS	PRACTICAL	40
4th Semester	CS 404	OBJECT ORIENTED PROGRAMMING IN JAVA	60
	CS 404	PRACTICAL	40
		THIRD YEAR	
	COD E	PAPER NAME	TOTAL MARKS
Semester	CS505	DATA STRUCTURES USING C	100
	CS 506	COMPUTER NETWORKS	100
	CS 507	PRACTICAL (DATA STRUCTURES USING	100
6th Semester	CS 608	DATABASE MANAGEMENT SYSTEMS	100
	CS 609	OPERATING SYSTEMS	100
	CS 610	PRACTICAL (DBMS & OS)	100

Syllabus for B.Sc. Computer Science Elective (I[st] Year)

Year	Semester	Paper	Topic	Marks
F' I R s T y E A R	Sem-I (July-Oct)	CS 101 (Theory) IT Tools & Applications	Introduction to Computer	10
			MS-Windows	10
			MS-Words	15
			MS-Excels	15
			MS-PowerPoint	05
			Introduction to Internet	05
			Total Marks	60
		CS 101P (Practical)	MS-Word	15
			MS-Excel	15
			MS-PowerPoint	5
			Introduction to Internet	5
			Total Marks	40
	Sem-Il (Jan. ,Apr)	CS202 (Theory) Problem Solving Techniques & Programming in C	Techniques of Problem Solving	10
			C fundamentals	10
			Input Output Functions	10
			Functions	10
			Arrays	10
			Pointers	10
			Total Marks	60
		CS202P (Practical)	Proqramminq in C	40
			Total Marks	40

Syllabus for B.Sc. Computer Science Elective (2nd Year)

Year	Semester	Paper	Topic	Marks
s E c O N D y E A R	Sem-III (July-Oct)	CS303 (Theory) Digital Computer Design	Information Representation	10
			Binary Logic	10
			Digital Logic	20
			Combinational Circuits	20
			Total Marks	60
		CS303P (Practical)	Study of Logic Gates	10
			Implementation of Logic circuits	10
			Adder and Subtractor	20
			Total Marks	40
	Sem-IV (Jan.-Apr)	CS404 (Theory) Object Oriented Programming in Java	Introduction to Java	20
			Classes	20
			Packages	10
			VO Streams	10
			Total Marks	60
		CS404P (Practical)	Programming in Java	40
			Total Marks	40

Syllabus for B.Sc. Computer Science Honours (3rd Year)

Year	Semester	Paper	Topic	Marks
THIRD YEAR	Sem-V (July-Oct)	CS505 (Theory) Data structures using C	Definition of a Data Structure	20
			Stacks and Queues	20
			Singly Linked List	20
			Trees and Graph	20
			Sorting and Searching	20
			Total Marks	100
		CS506 (Theory) Computer Networks	Basic of Computer networks	25
			Transmission Media	25
			Data communication components	25
			TCP/IP Protocol suite	25
			Total Marks	100
		CS507 (Practical)	Data Structures using C	100
			Total Marks	100
	Sem-VI (Jan.-Apr)	CS608 (Theory) Database Management Systems	Introduction	15
			Entity Relationship(ER) Modelling	15
			Relational Data Model	20
			Database Design	15
			Transaction Processing	15
			Case Study	20
			Total Marks	100
		CS609 (Theory) Operating Systems	Operating System	25
			Structures of OS	15
			Concepts of Synchronization	10
			Processor Management	10
			1/0 Management	10
			Memory Management	10
			File Systems	10
			Dead Lock	10
			Total Marks	100
		CS610 (Practical)	DBMS and Operating Systems	100
			Total Marks	100

Semester I: CS 101 - IT Tools and Applications Full Marks: 60

Unit 1. Introduction to Computer: 10 marks

Definition, Block Diagram along with its components, characteristics & classification of Computer.

Hardware (CPU, Primary and Secondary storage, I/0 devices, Bus structure, Computer Peripherals - VDU, Keyboard, Mouse, Printer),

Software (System and Application. Different System Software)

Programming Languages: Machine Language, Assembly Language, High Level Language, and Object Orient- ed Language.

Unit 2. MS Windows 10 marks

An overview of different versions of windows.

The User Interface: The Desktop, My Computer, Recycle Bin, Status Bar, Taskbar, Start button and Menu selection, Title Bar, Control Panel, Icons on the screen.

Windows Explorer, Viewing of Files & Folders, Creating & Renaming of Files & Folders and shortcuts, Copy & Paste, Drag & Drop, Opening & Closing of files & folders.

Unit 3. MS-WORD 15 marks

Word processing concepts, Opening, Saving and Closing an existing document, moving around in a document, Manipulating Windows, various ways to select the text, insert & delete, moving and copying text, Proofing document with spell check and grammar check, auto-correct and auto-complete, Auto-text, borders and shading, Headers & Footers,

· Handling graphics, Creating charts & Tables, Mail merge.

Unit 4. MS-EXCEL 15 marks

Spreadsheet Concepts, Creating, Saving and Editing a Workbook, Inserting, Deleting Work Sheets, entering data in a cell/formula, Copying and Moving data from selected cells, Handling operators in Formulae, Functions: Mathematical, Logical, Statistical, Text, financial, Date and Time functions, Using function Wizard. Formatting a worksheet: formatting cells-changing data alignment, changing date, number, character, or currency format, changing font, adding borders and colours, Charts and Graphs-Creating, Previewing, Modifying Charts.

Unit 5. MS-POWERPOINT 5 marks

Introducing PowerPoint, Building a presentation, Outlining the presentation, Creating a text slide, Creating chart slide, Formatting charts, Creating organisational charts & tables, Customizing a presentation, Drawing on slides, Creating slide shows.

Unit 6. INTRODUCTION TO INTERNET 5 marks

Basic internet terminology: World Wide Web, Browsers, E-mail, Search Engines.

Text book:

IT Tools and Applications; Satish Jain, Shashank Jain, Shashi Singh and Dr. Madulika Jain, BPB Publications

Reference book:

S. Sagman, "Microsoft Office 2007 for Windows", Pearson Education

Semester 1- Practical I – CS 101P - IT Tools and Applications Full Marks=40

Sample problems for practical in MS-WORD 15 marks

1. Perform the following operations by taking a simple text.
   a) make a paragraph from the text bold-face, underline, italic
   b) add a formula using subscript ad superscript.
   c) format a paragraph-left justified, right justified, centered
   d) spacing the text - single, one-half and double.
   e) select a part of the text & perform copy, cut & paste.
   f) replace a word e.g. "IT" by "information Technology".
   g) insert page no./ some text in header & footer.
2. Prepare a simple Invitation Card using different fond styles & sizes and send it to 10 friends using Mail-merge technique.
3. Create a table to accommodate your name, class, roll number and marks.

Sample problems for Practical in MS-EXCEL. 15 marks

Create a spreadsheet corresponding with following figures

Student	Testl	Test2	Test3	Test4	Total	Wt. Average	
Kanta	90	87	84	95	?	?	
Surmala	89	79	78	92	?	?	
Soni	93	88	68	79	?	?	
Gobind	94	79	80	93 .	?	?	
Test Average	?	?	?	?	?	?	

a) Calculate Wt. average using formula,
Wt. average = (test1 +test2+test3+test4)/4
b) Calculate Total & Average for each test using spreadsheet function.

III. Sample problems for Practical in MS-Power-point 5 Marks

1. Create a presentation that consists of four slides, (minimum) on the following topics
   a) Parts of a Computer .
   b) Advantages of Computer
   c) Applications of computer

IV. Sample problems for Practical in Internet. 5 Marks

1. Opening of an e-mail account.
2. Searching a topic on the web using a search engine.

Semester 2 : CS 202 - Problem Solving Techniques and Programming in C

Full Marks: 60

Unit 1. Techniques of Problem solving: 10 marks Concept of problem solving, _problem _ definition, Flowchart, Algorithms , pseudo- code, structured programming concepts, programming methodologies viz. top-down and bottom up programming.

Unit 2. C fundamentals 10 marks

Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.

Unit 3. Data input output functions 10 marks Simple C programs - Flow of control - if, if-else, while, do-while, for Loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.

Unit 4. Functions 10 marks

Definition proto-types - Passing arguments (including command line argument) - Recursions . Storage Classes - Automatic, External, Static, Register Variables - Multi-file programs.

Unit 5. Arrays and structures 10 marks

Defining and Processing - Passing arrays to functions - Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures - Unions - Bit wise operations.

Unit 6. Pointers and File 10 marks

Declarations - Passing pointers to Functions - Operation in Pointers.- Pointer and Arrays - Arrays of Pointers - Structures and Pointers - Files : creating, opening, reading, writing and closing a file.

Text Books :

1. E. Balagurusamy , Programming in Ansi C, 4th Edition.

References:

2. B.W. Kernighan and D M.Ritchie, The C Programming Language, 2nd Edition, PHI, 1988.
3. Gottfried,B.S, Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi 1996.
4. Computer Oriented Numerical Methods, V. Rajaraman, PHI.

Semester 2 - Practical II – CS 202P - Problem Solving Techniques and Programming in C

Full Marks: 40

I. Sample Programs for practical C:

- Write a C program to exchange the values of the two variables without using a third Variable
- Write a C program to convert a temperature from one unit to another say Celsius to Fahrenheit.
- Write a C program to calculate the Compound interest accepting the necessary data from the keyboard.
- Write a C program to generate natural numbers up to n term.
- Write a C program to find the sum of n natural numbers.
- Write a C program to generate the first 10 even numbers and also find its sum.
- Write a C program to generate the first 10 odd numbers and also find its sum.
- Write a C program to find the HCF and LCM of two/three numbers.
- Write a C program to find the mean of n numbers..
- Write a C program to compute the standard deviation from a list of numbers.
- Write a C program to generate Prime numbers up to n terms
- Write a C program to find Factorial of a number.
- Write a C program to generate Fibonacci series of number up to n term.
- Write a C program to generate Fibonacci numbers between 1 and N using recursion, N being a natural number.
- Write a C program to reverse the digits of a given positive number using recursion.
- Write a C program to find the addition of 2 matrices.
- Write a C program to find multiplication of 2 matrices.
- Write a C program to find the length of a string and arrange the string in ascending order.
- Write a C program to count the number of characters, vowels, consonants and digits in a text line
- Write a C program to arrange the accepted numbers in ascending order and descending order.

- Write a C program to find the maximum & minimum from a given list of numbers.
- Write a C program that will read a positive no. from the keyboard and checks whether the no. is prime or not.
- Write a C program to find the sum of digits of an integer reducing it to a single digit.
- Write a C program to check whether a string is a palindrome.
- Create a file of records where the structure of each record is as follows : Name, Basic Pay,DA(37% of Basic Pay).
- Read the file created in the preceding question.
- Create a file of records where each records should contain the following field Name, Rollno, Mld , Mk2,. ..., Mk6.
- Read the file created in the preceding question and Calculate the PC of each student.
- Write a C program using command line arguments to calculate the circumference of a circle whose radius is 5 cm.

N.B.: The programs given here are instructional in nature and are meant for providing a broad guideline in conducting practicals and framing questions.

Semester 3 : CS 303 - Digital Computer Design Full Marks: 60

Unit 1. Information Representation : 10 marks
Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation -ASCII, EBCDIC, Unicode

Unit 2. Binary Logic: 15 marks
Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions -Venn Diagram, Karnaugh Maps ..

Unit 3. Digital Logic: 20 marks
Basic Gates -AND, OR, NOT, Universal Gates -NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic -Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

Unit 4. Combinational Circuits: 15 marks
Half-Adder, Full-Adder, Half-Subtracter, Full-Subtracter, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven- Segment Decoder.

Text Books

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.

Reference Books

1. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
2. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill
3. Digital Principles and Applications, A.P. Malvina and D. Leach, Tata Mckraw Hill.

Semester 3 – CS 303P - Digital Computer Design (Practical) Full Marks: 40

I: Study of Logic Gates 10 Marks

1. Logic Gates using discrete components.
2. Verification of truth table for AND, OR, NOT, NA.N U, NOR and XOR gates.
3. Realisation of NOT, AND, OR, EX-OR gates with only NANO gates.
4. Realisation of NOT, AND, OR, EX-OR gates with only NOR gates.

II: Implementation of Logic circuits 10 Marks

1.Verfication of Associative law for AND, OR gates..,,
2.Karnaugh's Map reduction and logic circuit implementation.

III: Adder and Subtracter 20 Marks

1. Verification of Demorgan's Law.
2. Implementation of Half- Adder and Half- Subtracter or.
3. Implementation of Full-Adder and Full Subtracter or.
4. Four bit binary Adder.
5. Four bits binary subtracter using 1's and 2's complement.

Semester 4 : CS404 - Object Oriented Programming in Java Full Marks: 60

Unit 1. Introduction to Object Orientation Approach

History and evolution of Object Oriented Languages. 10 Marks

OOPs features : Encapsulation, Data Abstraction , Inheritance, Multiple Inheritance, Polymorphism, Message Passing, Extensibility, Persistence, Delegation, Genericity.

Unit 2. Introduction to Java . 10 Marks

Features of Java - Object Oriented Concepts - Lexical Issues - Data Types - Variables - Arrays - Operators - Control Statements.

Unit 3. Classes 20 Marks

Objects - Constructors - Overloading method - Access Control - Static and fixed methods - Inner Classes - String Class - Inheritance - Overriding methods - Using super- Abstract class.

Unit 4. Packages 10Marks

Interfaces - Exception Handling - Throw and Throws - Thread - Synchronization - Messaging - Runnable Interface - Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads - Multithreading.

Unit 5. I/O Streams 10 Marks

File Streams - Applets - String Objects - String Buffer - Char Array - Java Utilities - Code Documentation.

Reference books:

1. Cay S.Horstmann, Gary Cornell - Core Java 2 Volume I Fundamentals ,5th Edn. PHI,2000.
2. P. Naughton and H. Schildt - Java2 (The Complete Reference) - Third Edition,TMH 1999.
3. K. Arnold and J, Gosling- The Java: Programming Language - Second Edition, Addison Wesley,1996.

Semester 4: CS 404P - Object Oriented Programming in Java (Practical)

- Write a Java program to generate natural numbers up to n term.

- Write a Java program to generate the first 10 even numbers and also find its sum.
- Write a Java program that will read a positive no. from the keyboard and checks whether the no. is prime or not.
- Write a Java program to find Factorial of a number.
- Write a Java program to find the maximum & minimum from a given list of numbers.
- Write a Java program to find the addition of 2 matrices.
- Write a Java program to find multiplication of 2 matrices.
- Write a Java program to implement bubble-sort.
- Write a Java program to find the sum of digits of an integer reducing it to a single digit.
- Write Java programs related to
- Class and Objects.
- Constructor and Operator overloading
- Inheritance .

N.B.: The programs given here are instructional in nature and are meant for providing a broad guideline in conducting practicals and framing questions.

Semester 5: CS 505- Data structures using C Full Marks: 100

UNIT 1. Definition of a Data structure 20 marks
Primitive and composite Data Types, Asymptotic notations, Arrays, Operations on Arrays, Order lists.

UNIT 2. Stacks and Queues 20 marks
Implementation of Stack using arrays and link list, application of stack - Infix to Postfix Conversion, Queues - Circular Queue.

UNIT 3. Linked List 20 marks
Singly linked list Operations, Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List - Operations.

UNIT 4. Trees and Graphs 20 marks
Binary Trees, Operations - Tree Traversals; Graph - Definition, Types of Graphs, Traversal - Shortest Path; Dijkstra's Algorithm.

UNIT 5. Sorting and searching 20 marks
Searching techniques - linear, binary, sorting- bubble, insertion, selection, merge and their complexity.

Text Book:

1. Data structure using C and C++: Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum , Second Edition, Pearson Prentice Hall.

References:

1. E.Horowitz and S. Shani Fundamentals of Data Structures in C, Galgotia Pub. 1999.
2. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd., 1998.
3. R. Kruse C.L. Tondo and B. Leung, Data Structures and Program design in C, PHI, 1997.

Semester 5: CS 506 - Computer Networks Full Marks: 100

Unit 1. Basic of computer networks: 25 marks

Networking of computer-Advantages and disadvantages of computer networking Types of networks – LAN, MAN, WAN, Wireless Network Topology - Star, Ring, Bus, Tree, Complete, Irregular

Reference Model – The OSI reference Model, the TCP/I P reference model.

Telephone system: system, the local loops, trunks and multiplexing(FDM and TDM) Switching-circuit switching, message switching, Packet switching.

Unit 2. Transmission Media: 25 marks

Transmission media -Magnetic media, twisted pair, co-axial cable (base band and broadband), Fiber optics principle, transmission of light through fiber, fiber cables, fiber optics network, Comparison of fiber optic and copper wire. Wireless Transmission (The electromagnetic spectrum, Radio transmission, Microwave transmission, infrared and Millimeter waves, Light wave transmission).

Unit 3. Data communication components: 25 marks

Modem, routers, bridges, Hubs, Switches.Data link protocols: Asynchronous, Synchronous, Character Oriented and bit oriented protocols.

Unit 4. IP Addressing: 25 marks

IP address class, network and host addressing, subnet, subnet mask, subnetting, super netting.
TCP/IP Protocol.suite:
Network Layer: IP protocol, address resolution protocol (ARP) , Reverse address resolution protocol (RARP), Internet control message protocol (ICMP) , internet group message protocol (IGMP).
Transport Layer: user datagram protocol (UDP), transmission control.protocol (TCP), case studies: (there is no weight age in examination),
Application Layer: Bootstrap protocol (BOOP), Dynamic host configuration protocol (DHCP), Domain name system (DNS), telnet (terminal network), Hypertext transfer protocol (HTTP), file transfer protocol (FTP), trivial file transfer protocol (TFTP), *Simple* main transfer protocol (SMTP), Simple network management protocol (SNMP).

Text Book:

1. Computer Networks - A.S Tanenbaum, 4th edition, PHI

References:

2. B.A. Forouzan - Data Communication and Networking -4th Edition - TMH - 2007.
3. Jean Wairand - Communication Networks (A first Course) - Second Edition - WCB/ McGraw Hill - 1998.

Semester 5: CS 507 - Data structures using C (Practical)

Full Marks: 100

1. Implement PUSH, POP operations of stack using Arrays.
2. Implement PUSH, POP operations of stack using Pointers.
4. Implement add, delete operations of a queue using Arrays.
5. Implement add, delete operations of a queue using Pointers.
6. Implement stack using linked list.
7. Conversion of infix to postfix using stack.
8. Postfix Expression Evaluation.
9. Addition of two polynomials using Arrays and Pointers.
10. Creation, insertion, and deletion in doubly linked list.
11. Binary tree traversals (in-order, pre-order, and post-order) using linked list.
12. Depth First Search and Breadth first Search for Graphs using Recursion.

N.B.: The programs given here are instructional in nature and are meant for providing a broad guideline in conducting practicals and framing questions.

Semester 6: CS 608 - Database Management Systems Full Marks: 100

Unit 1. Introduction: 15 marks
Characteristics of database approach, data models, database system architecture and data independence.

Unit 2. Entity Relationship(ER) Modeling: 15 marks

Entity types, relationships, constraints.

Unit 3. Relational data model: 20 marks
Relational model concepts, relational constraints, relational algebra, SQL queries, programming using embedded SQL.

Unit 4. Database design: 15 marks
Mapping ER model to relational database, functional dependencies, normal forms.

Unit 5. Transaction Processing: 15 marks
ACID properties, concurrency control, recovery.

Unit 6. Case Study:
Oracle/MySQL 20 marks

Text Books:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education 2010.

Reference books:

1. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw- Hill 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill 2010.

Semester 6: CS 609 - Operating Systems Full Marks: 100

Unit 1. Operating System 25 marks

What is OS? Multiprogramming OS (Concurrent Processing System), Concepts of Process & Threads ,Concept of Interrupts, System Callsss s . Files, Shell, System ,Files, Shell, Introduction to shell programming.

Unit 2. Structures of OS:

,OS is an interrupt drive 15 marks

Monolithic, Layered, Virtual, Client Server and Distributed Model.

Unit 3. Concepts of Synchronization:
10 marks Semaphores, Critical Regions, Monitor Inter Process Communication Mechanism.

Unit 4. Processor Management:
10 marks
Scheduling, Round-robin, Priority Queue.10marks

Unit 5. *I/O* management:
10 marks
Device Management.

Unit 6. Memory Management:
10 marks
Multiprogramming, Swapping, Paging, Virtual memory, Page Replacement Techniques.

Unit 7. File Systems:
10 marks
Files and Directories, File Servers, Security and Protection.

Unit 8. Dead Lock:
10 marks
Definition, Detection and prevention.

Text book:

1. A. Silberchatz P.B.Galvin, Gange, "Operating System Concepts", 6th Edn., John Wiley & Sons., 2002.

Reference books:

I. H.M. Deitel, An Introduction to Operating System, Second Edition, Addison Wesley, 1990.

2. A. S. Tanenbaum, Operating System Design and Implementation, PHI

3. A. Silberchatz P.B.Galvin, Gange, "Operating System Concepts", 6th Edn., John Wiley & Sons., 2002.

Semester 6: CS 610 DBMS and Operating Systems Lab. Full Marks: 100

DBMS : SQL queries, Java programs to access database and execute queries.(50%)
Operation Systems : Process creation, Process termination, etc., program to demonstrate process synchronisation using semaphores,mutual exclusion, etc. (50%)

Semester 6: CSP 505- Data structures using C and Computer Networks

Full Marks: 60
15 Marks

UNIT 1.

Definition of Data Structures, primitive and composite data types, arrays, operations on arrays, order lists, stack, queues, linked list, implementation of stack using arrays and linked list, application of stack (Infix to Postfix Conversion), Singly linked list operations, applications of singly linked list (representation of a polynomial, polynomial addition), doubly linked list operations.

UNIT 2. 15 marks

Binary trees, operations-tree traversals, Graph-Definition, types of graphs, Graph traversals –Shortest Path, Dijkstra's algorithm, Searching Techniques---linear, binary;
Sorting –Bubble, Insertion, Selection, Merge.

UNIT 3. 15 marks

Introduction to Computer Communications and Network Technologies; Use of Computer Networks; Network Devices, Nodes and Hosts; Types of Computer Networks and their Topologies; Network Software; Network Design issues and Protocols; Connection-Oriented and connectionless services; Network Applications and Application Protocols; Computer Communications and Networking Models: Decentralized and Centralized Systems, Distributed Systems, Client/Server Model, peer-to-Peer Model, web-based Model. Network Architecture and OSi Reference Model; Example Networks; The Internet, Frame Relay, ATM.

UNIT 4. 15 marks

Intranet and Internet; Servers and Clients; Ports; Domain Name Server (DNS); IP addressing, WWW, Browsers, Social Networking, E-mail, Chatting, Voice and Video Conferencing.

Text Books:

1. Data Structure using C and C++: Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tanenbaum, second edition, Pearson Prentice Hall.
2. Computer Networks –A.S. tanenbaum, 4th Edition, PHI.

References:

1. E.Horowwitz and S. Shani Fundamentals of Data structures in C, Galgotia Pub.1999.
2. Horowwitz S. Sahni and S. Rajesekaran, Computer Algoriths, galgotia Pub. Pvt. Ltd., 1998
3. R. Kruse C.L Tondo and B. Leung, Data Structures and program Design in C, PHI, 1997.
4. B.A. Forouzan—Data Communication and Networking – 4th Edition –TMH-2007
5. Walrand –Communication Networks (A first Course) – Second Edition – WCB/McGraw Hill -1998.

Semester 5. CSP 505P-data Structures using C (Practical)

Full marks: 40

1. Implement PUSH, POP operations of stack using Arrays.
2. Implement PUSH, POP operations of stack using Pointers.
3. Implement add, delete operations of a queue using Arrays.
4. Implement add, delete operations of a queue using Pointers.
5. Implement stack using linked list.
6. Conversion of infix to postfix using stack.
7. Postfix Expression Evaluation.
8. Addition of two polynomials using Arrays and Pointers.
9. Creation, Insertion and Deletion in doubly linked list.
10. Binary tree traversals (in-order, pre-order and post-order) using linked list.
11. Depth First Search and Breadth First Search for Graphs using Recursion.

N.B. The programs given here are instructional in nature and are meant for providing a broad guideline in conducting practicals and framing questions.

Semester 6 : CSP 601- Database Management Systems and Operating Systems

Full Marks: 60

UNIT 1. Database System, Concepts and Architecture: 10 Marks

Basic concepts of Databases and database management system, characteristics of the database approach, brief approach, brief history of database applications, categories of Data Models, Three-Schema Architecture and Data Independence, DBMS languages, component modules and their Interactions, Two-tier client/server architectures, Three-Tier and n-Tier architectures for web applications and classification of DBMS.

UNIT 2. Entity-Relationship Modeling, Relational Data-Model and Constraints. 10 Marks

Concepts of Entity types, Attributes, Keys, Relationship types, constraints(cardinality ration and participation), UML class diagrams, Concepts of Relations, Domains, Attributes, tuples, characteristics of relations, domain constraints, key constraints, constraints on null values, entity Integrity, referential integrity and foreign keys, triggers and assertions, insert, delete and update operations, Online Transaction Processing.

UNIT 3. Relational Algebra, Queries, Functional Dependencies and Normal Forms 10 Marks

Select, Project, Rename, union, intersection and minus operations, Binary relational operations: Join and Division, Equijoin, Natural join, Outer join, Aggregate functions and grouping and examples of queries, Inference rules for Functional Dependencies, Normal Forms- 1NF, 2NF, 3NF and BCNF.

UNIT 4: Operating System and its Structure 10 Marks

What is OS? Multiprogramming OS (Concurrent Processing System), concept of process & Threads, Concepts of Interrupts, System Calls, OS as an interrupt driven system. Files, Shell: Introduction to shell programming, Virtual Client Server and Distributed Model.

UNIT 5. Concepts of Synchronization. 5 Marks

Semaphores, Critical Regions, Monitors Inter Process Communication Mechanism.

UNIT 6. Process Management 5 marks

Scheduling, Round-Robin, Priority Queue.

UNIT 7.I/O Management 5 Marks

Device Management

UNIT 8. Memory Management 5 Marks

Multiprogramming, Swapping, Paging, Virtual Memory, Page Replacement Techniques.

Text Books:

1.R. Bhansri S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education 2010.

2. A. Silberschatz P.B. Galvin, Gange, "Operating Systems Concepts', 6th Edn., John Wiley & Sons., 2002

Reference Books:

1. Ramakrishanan, I. Gehrke, Datanbase Management Systems 3rd Edition, MdGraw-Hill 2002.

2.A. Silberschatz, H.F. Korth, s. Sudarshan, database System Concepts 6th Editor, McGraw Hill 2010.

3. H.M Deltal, An Introduction to Operating System, Second edition, Addison Wesley 1990.
4. A.S Tanenbam, Operating System Design and Implementation, PHI.

Semester 6: CSP 601P (DBMS) Full marks:40

Q1. Create a table sinfo having the columns rollno,name,address,age and enter some meaningful records . Find the youngest student.

Q2. Create a table sinfo having the columns rollno,name,address,age and enter some meaningful records. Change the name of all the students whose name starts with 'm' to 'M'.

Q3. Create a table sinfo having the columns rollno,name,address,age and enter some meaningful records. List all the students whose name contain the letter 'r' or 'R'.

Q4. Create a table sinfo having the columns rollno,name,address,age and enter some meaningful records. Delete or remove the record of the student whose roll no is 5120.

Q5. Create a table sinfo having the columns rollno,name,address,age and enter some meaningful records. Retrieve all distinct marks for each student.

Q6. Create a table employee having the columns empno, name, address, salary, dept and enter some meaningful records. List out all the employees whose monthly income is greater than Rs. 3000 and less than Rs. 50000.

Q7. Create a table semployee having the columns empno,name,address,salary, dept and enter some meaningful records. Find out all the employees whose address is 'Canchipur'

Q8. Create a table student having the columns rollno,name,address,exam_attendance and enter some meaningful records. Retrieve the name of all the students who are absent from appearing examination.

N.B. The programs given here are instructional in nature and are meant for providing a broad guideline in conducting practicals and framing questions.