



ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSORE
Subject- COMPUTER SCIENCE
Revised Syllabus for B.Sc., Course under Semester Scheme
The Scheme of Teaching & Examination from the Academic Year- 2016

Semester	Title of the Paper	Code	Credits	Teaching Scheme Hours per Week		Examination Scheme			
				Theory	Practical	Duration	Practical Proper Max. Marks	I A Max Marks	Total Marks
I	Paper-I COMPUTER CONCEPTS & C PROGRAMMING	16MA280	3	03	-	3	60	10	100
	Practical Paper-I C PROGRAMMING LAB	16MA 282	1.5	-	03	3	20	10	
II	Paper-II DATA STRUCTURE APPLICATIONS WITH C	16MB 280	3	03	-	3	60	10	100
	Practical Paper-II DATA STRUCTURES LAB	16MB 282	1.5	-	03	3	20	10	
III	Paper-III RDBMS and VISUAL PROGRAMMING	16MC 280	3	03	-	3	60	10	100
	Practical Paper-III RDBS and VISUAL PROGRAMMING LAB	16MC282	1.5	-	03	3	20	10	
IV	Paper-IV WEB DESIGNING	16MD 280	3	03	-	3	60	10	100
	Practical Paper-IV WEB DESIGNING LAB	16MD282	1.5	-	03	3	20	10	
V	Paper-V CPU ARCHITECTURE & MICROPROCESSOR	16ME 280	3	03	-	3	80	20	300
	Paper-VI COMPUTER NETWORK & DATA COMMUNICATION	16ME 282	3	03	-	3	80	20	
	Practical Paper-V MICROPROCESSOR LAB	16ME 284	1.5	-	03	3	40	10	
	Practical Paper-VI NETWORKING	16ME 286	1.5		03	3	40	10	
VI	Paper-VIII ADV JAVA	16MF280	3	03	-	3	80	20	300
	Paper-IX OPERATING SYSTEM AND SYSTEM SOFTWARE	16MF282	3	03	-	3	80	20	
	Practical Paper-VIII ADV JAVA	16MF284	1.5	-	3	3	40	10	
	Practical Paper- IX LINUX AND SHELL PROGRAMMING and PROJECT WORK (FINAL REPORT SUBMISSION)	16MF286	1.5	-	3	3	20	10	
							20	-	
			36	-	-		800	200	1000

PREAMBLE

The existing BSc Computer Science syllabus is updated to suit was little outdated as we were teaching software which are less used these days.

- First semester syllabus was about programming basics which was introduced through C programming language. The computer fundamentals were thought as General Studies in third semester. These papers General Studies, C programming and data structure of I,II and III semester were combined to make two papers. This was done to introduce a new paper as General Studies.
- Third semester new concept of RDBMS and C# has been introduced according to the recent development in software.
- In General Studies paper existing syllabus (Fundamentals) has been replaced by Software Engineering which will be useful for software development.
- As there is constant requirement of web developers, web designing has been introduced in Fourth semester. There is no change in Fifth and Sixth semester syllabus.
- Fifth semester comprises of two papers, CPU Architecture & Microprocessor and Computer Networks & Data Communication and project synopsis has to be submitted by the student during 5th Semester.
- Sixth semester comprises of Operating System and Shell programming and Advanced Java.
- Project demonstration and presentation will be done during the semester.

SEMESTER -1
COMPUTER SCIENCE
Paper 1: COMPUTER CONCEPTS & C PROGRAMMING - 16MA280
THEORY: 60 + 10 (IA)
Teaching Hours 16 Weeks x 3Hrs =48 Hrs

UNIT-I	Computer Fundamental: Introduction, Classification of Computers (Based on all Criteria), Functional units, Evolutional of Computer Languages, Assembler, Compiler, Interpreter. Number Systems and Boolean Algebra	16 hrs
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Introduction to number systems- Numeric and Non-numeric representation of data - Decimal, Binary (Addition, subtraction, Multiplication, division, 1's and 2's Complement methods), Octal and hexadecimal number systems. Conversion from one number system to another number system. Excess-3-code and gray code. Conversion between gray and binary codes. Boolean Algebra- Laws, De-Morgan's Theorem, Simplification of Expressions using K Map (Up to 4 Variables), Logic Gates- AND, OR, NOT, and Universal Gates. Combinational Logic Circuit- Half and Full Adder, Half and Full Subtractors.

UNIT II	Introduction to C language History, Features and Applications of 'C'. Programming preliminaries – Character set, definitions and declarations of identifiers, Variables, Constants, Keywords, Data types with examples.	16 hrs
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Operators and expressions – Various operators and expressions, Operator precedence with example programs. Input-output statements – various types of standard input output statements, standard mathematical functions, with example programs. Control structures – Decisions making- Different forms of if statements, switch statements, unconditional branching statements (with example programs), Looping statements with example programs.

Arrays– Definitions and need of arrays, 1-D and 2-D arrays with example programs.

UNIT III	STRING HANDLING – Declarations, Initialization, reading and writing of strings, operations and string functions with example programs.	16 hrs
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FUNCTIONS – Definitions and need of functions. Library functions, user defined functions in detail, function declaration and prototypes call by value and call by reference, functions and arrays, recursion, storage classes with example program.

STRUCTURES AND UNIONS – Definition and use of structures. Declaring, Initializing and Accessing Structure member, Arrays of Structures, Nested Structures, uses of structures, Introduction to Union.

Reference Books:

1. Digital Fundamentals, Floyd UBS Publication.
2. Digital Logic- Thomas C Bartee.
3. Problem Solving with C, M.T. Somashekara, PHI Learning, New Delhi, 2009
4. Programming in C – E Balaguruswamy, Tata McGraw Hill Publications.
5. Computer Concepts and C- P B Kotur.

SEMESTER -1
COMPUTER SCIENCE
Practical Paper 1: C PROGRAMMING LAB -16MA282
PRACTICALS: 20 + 10 (IA)
Practical Hours: 16 Weeks x 3Hrs =48 Hrs

Part A

- 1 Program to pick out the biggest and smallest number among three given numbers.
2. Program to find sum of even and odd numbers separately in the given list.
3. Program to find largest and smallest of N numbers
4. Program to find the roots of the quadratic equation using nested if.
5. Given two numbers, program to perform arithmetic operations using switch Statement.
6. Program to generate Fibonacci series up to N numbers using do – while loop.
- 7 Program to find the reverse of the given number. Also sum and count the number of digits and check whether the given number is palindrome or not using while –do loop.
- 8 Program to generate prime numbers using for loop.
- 9 Program to search an element using linear search technique.
- 10 Program to check whether the given number is factorial of a number or not.

Part B

11. Program to insert a sub-string into a given string.
- 12 Program to add and subtract two M x N matrices.
13. Program to multiply two M x N matrices.
14. Program to find trace and norm of a square matrix and print its principle diagonal elements.
15. Program to exchange principle and secondary diagonal elements of a square matrix.
- 16 Program to find the factorial of a number using recursion.
- 17 Program to swap two number using functions.
- 18 Program to read and write information of an employee using structure.
- 19 Program to create simple marks card assuming appropriate conditions.
- 20 Program to read and write information of an employee using a file

SEMESTER -II
COMPUTER SCIENCE
Paper 2: DATA STRUCTURE WITH C -16MB280
THEORY: 60 + 10 (IA)
Teaching Hours 16 Weeks x 3Hrs =48 Hrs

- UNIT I:** Pointers – Introduction, declaring and initializing a pointer, accessing a variable through its pointer. Pointer expressions, pointer increments and scale factor, pointers and arrays, pointers and functions, pointers and structures with example programs. **16hrs**
File Handling: - Introduction defining and opening a file, closing a file, input/output operations on files, error handling during input/output operations, random access to files with examples.
Dynamic memory allocation – MALLOC, CALLOC, REALLOC, FREE with examples, Pre-processing directives, macro with arguments.
Introduction to Problem Solving Techniques Steps in problem solving -Algorithm and flow charts.
- UNIT II:** Linear Data Structure and their sequential storage representation Concept and terminology for non-primitive Data structures, Storage structures for arrays, Various operations on Arrays- Traversal, Insertion, Deletion, Sorting and Searching. Stacks, Definitions and Concepts, Operations on stacks, Applications of stacks- **16hrs**
Recursion, Infix to postfix, Evaluating postfix expressions, Queues-Linear and circular Queue.
Pointers and Linked Allocation, Linked linear lists,
Operations on Linear lists using singly linked storage structures-Insertion and Deletion operations circularly linked linear lists-memory representation, Doubly linked linear lists-memory representation.
- UNIT III:** Nonlinear Data Structures **16hrs**
Trees - Introduction as non-linear data structure, Concepts of node, Terminal node, Depth, General Tree, Definition for Binary Tree, Left Skewed Tree, Right Skewed Tree, memory representation using Arrays and Linked List, Tree Traversal Algorithms- Pre-order , In-order, Post-order and Implementation of Tree Traversal Algorithm
Graphs – Introduction, Definition, Terminology, Representation, Traversal.

Reference Books:

1. An Introduction to Data Structures with Applications 2nd edition - J.P.Trembly and Sorenson, McGraw Hill 2001.
2. Dromey-How to solve it by computer, PHI.
3. Data Structures using C- Padma Reddy.
4. Data structures using C & C++ by Yedidyah Langsun, Moshe J Augenstein, Tenenbaum, Second Edition, Prentice Hall of India Ltd.
5. Problem Solving with Data Structure, Schaum Outline Series.

SEMESTER -II
COMPUTER SCIENCE
Practical paper 2 : DATA STRUCTURES LAB-16MB282
PRACTICAL: 20 + 10 (IA)
Practical Hours: 16 Weeks x 3Hrs =48 Hrs

Part – A

- 1 Program to find lower triangular and upper triangular matrices for the given matrix.
- 2 Write an interactive program to insert an element at the given position and delete an element at the specified position in the given array.
- 3 Program to search an element identify the number of occurrences with locations in linear array.
- 4 Program to sort the given M x N matrix row-wise and column-wise using bubble sorting technique.
- 5 Write an interactive program to search an element in the given linear array using linear and binary searching technique.
- 6 Write a program to Merge two sorted arrays.

Part – B

- 7 Write an interactive program to implement the following operations on stack using arrays
 - a. PUSH
 - b. POP
- 8 Program to implement Tower of Hanoi problem.
- 9 Write an interactive program to perform insertion and deletion operations in Linear Queue using arrays.
- 10 Write an interactive program to perform insertion and deletion operations in Circular Queue using arrays.
- 11 Write an interactive program to insert a node in a linked list at the front, delete a node from the rear and display
- 12 Write an interactive program to implement preorder, post order and in order traversal of a binary tree using linked list

SEMESTER-III
COMPUTER SCIENCE
Paper 3: RDBMS and VISUAL PROGRAMMING - 16MC280
Theory : 60 + 10 (IA)
Teaching Hours 16 Weeks x 3Hrs =48 Hrs

- UNIT I:** **DBMS:** Problem with File-based systems:- Introduction to Database and Database Management systems, objectives of database management, Overview of DBMS, Database administrator, Database Designers, End users. **16 hrs**
Data Models, Schemas and instances
Three-Schema Architecture and Data independence, DBMS languages, E-R diagram with some case-study (Strong entity and weak entity) Different types of keys (Primary key, Secondary key, Candidate key, Foreign key and Alternate key)
RDBMS: Introduction to RDBMS, Structure of Relational Database, Relational Algebra, Extended Relational Algebra Operations, Modification of the Database, Tuple Relational Calculus
Relational Databases
Introduction to SQL, data types and table definition-constraints, primary key, Unique, check and Referential Integrity.
DDL – Create, Alter, Truncate, View and Drop command
SQL Operator (Arithmetic, Comparison, Logical operator)
DML - Insert, Select, Select with different clauses (Simple, Nested Queries), Update and Delete Command. DCL – Grant Privilege command, Revoke privilege command, Transaction control Language- commit, Savepoint, Rollback command. SQL function, SET operator (Union, Unionall, Intersect, Difference) JOIN (Equi-join, Non Equi-Join)
- UNIT II:** Introduction to C#, Understanding C# environment, Overview of C#, Literals, variables, and Data types, operators and expressions, Decision making and branching, Decision making and looping, Methods in C#, Handling Arrays, Manipulating Strings, Structures and Enumerations
Classes and objects, inheritance and polymorphism, interface: multiple inheritance
Managing errors and exceptions. **16 hrs**
- UNIT III:** **Windows Forms:** Control class, Standard controls and components (check box, radio button, comboBox, ListBox, Checked List Box, Label, ListView, picture box, textbox, rich text box, panel, flow layout panel and table layout panel, tool strip, menu strip (Refer Wrox programmer to programmer only the mentioned standard controls)) **16hrs**
ADO.Net overview, Using database connection, commands (Refer Wrox programmer to programmer page no. 846-860) **Fast Data Access:** Data Reader, Data Set class (Refer Wrox programmer to programmer page no. 863-870)
Text Books :
Text: 1. Analysis and Information Systems : Raja Raman ,
Chapter: 1,2,3,4,,5,6,7,10,11,12,14,15
1. Programmer in C# A Primer by Balagurusamy E and Wrox Programmer to
2. Programmer Professional C# 2008
Reference Books :
1. Database system concepts 4th edition by Korth\sudarshan, silberchatz.
2. Database system :Navathe
3. Database Management Systems : Alexis Leon & Mathews leon
4. SQL : Ivan Bayross

SEMESTER-III
COMPUTER SCIENCE
Practical paper 3: RDBMS & VISUAL PROGRAMMING LAB - 16MC282
Practical: 20 + 10 (IA)
Practical Hours :16 Weeks x 3Hrs =48 Hrs

Part A:

1. Create a table 'STUDENT' to store the details of marks of a student.

Field	Type	Width	constraint
Student_ID	Numeric	5	Unique
Name	Text	20	
Class	Numeric	2	
English	Numeric	3	
Hindi	Numeric	3	
Maths	Numeric	3	
Science	Numeric	3	
Social Science	Numeric	3	

Create a table 'Transaction' to have the following fields.

Field	Type	Width	constraint
Trans_No	Numeric	5	Unique
Item_No	Numeric	5	
Item_Name	Text	25	
Trans_Date	date		
Quantity	Numeric	5	

After creating the tables, do the following:

- b. Set field properties of each field.
- d. Modify fields in the table.
- f. Modify the table 'STUDENT' to include the following fields:

Field	Type	Width	constraint
Total	Numeric	4	
Average	Numeric	5	2 decimal places
Result	Text	10	

- h. Apply necessary validation rules to each field.
- j. Rename the field 'Total' by 'Aggregate'.
- l. Delete field 'Result'.
- n. Add records.

2. For the tables created in above problem, do the following:
- b. Apply filters to list students with marks greater than 60.
 - d. Apply filters to get transactions for a date.
 - f. Sort students by name.
 - h. Sort transactions by date.
 - j. Create queries to list students with Aggregate <300 and Aggregate >= 250.
 - l. Total transaction quantity for a given date.
3. Using the tables created in problem number 1, do the following:

- b. Create forms to view data.
 - d. Add, Delete and Save records through the forms created.
 - f. Change the structure of the above forms in design view.
4. Using the tables created in problem number 1, and/ or related queries, generate the following reports:
 - b. List of students with marks >60 in English.
 - d. List of students whose Average is >80.
 - f. List of Items for a given Transaction date.
 - h. Day-wise transactions for each month under the month's heading showing total transaction at the end.
5. Create a table "EMPLOYEE" to store the details with following fields
(at least 10 records)

Field	Type	Width	Constraints
Employee id	Number	5	Primary key
Name	String	20	
Address	Text	50	Validate for not accepting more than 2 decimal places
Basic salary	Number	6	
Net salary	Number	6	

6. . Using above table Generate the following query with reports
 - a) By Employee No
 - b) By salary wise
 - c) List the employees, whose basic salary is > 10000

Part B:

1. Application using class and objects
2. Console application to perform string handling functions.
3. Console application to create user defined exception
4. Console application to achieve multiple inheritance using interface.
5. Console application to check the priority of thread using multithreading
6. Design a window application to find the factorial of a number and check the number is a prime number
7. Design a calculator using windows application
8. Design a window application to insert, delete, update and search operation of a student information
9. Design a window application to calculate the NET SALARY of an Employee
10. Design a window application to change the size of the font using menu strip and tool strip
11. Design a window application to use a frame control to navigate to web pages
12. Design a window application to Display Content in a Multitabbed User Interface

SEMESTER-IV
COMPUTER SCIENCE
Paper 4: WEB DESIGNING- 16MD280
THEORY : 60 + 10 (IA)
Teaching Hours 16 Weeks x 3Hrs =48 Hrs

UNIT I:	Internet: introduction to internet, electronic mail, introduction to HTML and web page authoring using HTML. Web design: web design, web design process, site types and architecture <ol style="list-style-type: none">WEB publishing HTML conceptImage basicsURL, hyperlinks Hspace, Vspace, height, width, image as buttons, text alignment color settingsTables lists, types of lists. Frames <ol style="list-style-type: none">Frame setFrame targetingHorizontal splittingVertical splitting
UNIT II:	<ol style="list-style-type: none">Input fields<ol style="list-style-type: none">Text boxPasswordButtonDrop down list boxRadio buttonCheckboxesSubmit/reset buttonMethods get/postStyle sheet<ol style="list-style-type: none">Setting backgroundRepeating background imageSetting text colorText alignmentText decorationFont and formatting Borders – different borders on each side, margin, padding, list and positioning and alignment of an image. Placing an element behind another.
UNIT III:	Scripting languages -java script and VB script. Java script introduction and history Script basics <ol style="list-style-type: none">SyntaxVariablesKeywordsPrimitive typesReference typesOperatorsStatementsFunctions Object basics

Object oriented terminology working with object. Object types.

Java script in the browser

1. Java script in HTML
2. The <script> tag a. external file format b. inline code versus external files c. tag placement d. the <nonscript> tag
3. The browser model- the window object, the document object, the location object, the navigator object, the screen object.

Events

Event flow, event handling\listeners, the event object, types of events

Forms and data integrity

Form basics, scripting the <form> element, textboxes

Control structures

- a. If statements
- b. Switch statements
- c. While loops
- d. Do while loops
- e. For loops

Functions

User defined functions, function scope, returning values by values, returning values by reference.

UNIT IV: Advanced OOP and design patterns

Introduction, object declaring a class the new keyword and constructor destructor, accessing methods and properties using the \$this variable, public, private and protect static method, class constants, cloning object.

How to write a WEB application with java script

Introduction, embedding into HTML, user input, safe handling user input, input validation, working with passwords, cookies and sessions.

Text Book

HTML

1. HTML black book
2. The complete reference HTML second edition

Java script

1. Professional java script for web developers, by Nicholas C Zakas dreamtech publication.

SEMESTER-IV
COMPUTER SCIENCE
Practical Paper 4: WEB DESIGNING LAB - 16MD282
PRACTICAL: 20 + 10 (IA)
Practical Hours: 16 Weeks x 3Hrs =48 Hrs

(Exercises should be based on Web Designing Theory)

1. Write a html program to print the text in blue color
2. Write a html program to link two files
3. Write a html program to display marquee
4. Write a html program to insert an image
5. Write a java script program to generate textbox
6. Write a java script program to generate checkbox
7. Write a java script program to generate radio button
8. Write a java script program to generate dropdown list
9. Write a java script program to display the position of left most vowel in the string
10. Write a java script program to generate Fibonacci series
11. Write a java script program to reverse a number
12. Write a java script program to find even or odd
13. Write a java script program to print the week days according to the number entered
14. Write a java script program to perform all arithmetic operations.
15. Write a java script to check whether the given number is prime or not.
16. Write a java script program to calculate the square of a number
17. Write a java script program to check whether the number is palindrome or not
18. Write a java script program to create an online registration form

SEMESTER- V
COMPUTER SCIENCE
Paper 5: CPU ARCHITECTURE and MICROPROCESSOR -16ME280
THEORY: 80 + 20 (IA)
Teaching Hours 16 Weeks x 3Hrs =48 Hrs

UNIT 1: COMPUTER ARCHITECTURE **16 hrs**

CPU Architecture, Addressing modes – Direct, Indirect, Immediate, Relative, Indexed.

Addressing Format: Zero Address, One Address, One-and-half Address, Two Address, Three Address.

I/O Transfers – Program controlled, Interrupt controlled, DMA (Direct Memory Access)

UNIT II: MICROPROCESSOR **16 hrs**

Introduction to Microprocessor, Assembly Language, 8085 Microprocessor Architecture, Pin diagram, Introduction to 8085 instructions set, Assembly Language Programming.

UNIT III: PROGRAMMING AND INTERFACING **16 hrs**

Programming Technology of 8085 with additional instructions, counters and time delays. Stacks and Subroutines, Interfacing Peripherals (I/Os) and applications. Interrupts, Interfacing data converts, Keyboard interfacing.

Introduction to 8086, advantages over 8085, additional features of 8086, modified addressing schemes.

Text Books:

Unit 1:

1. M. Morris Mano – Digital logic and Computer design, PHI Pvt. Ltd., New Delhi.

Unit 2 & Unit 3:

1. Ramesh S. Gaonkar – Microprocessor Architecture, Programming and Application with 8085 – Penram International Publishing (India).

Reference:

Unit 1:

1. V. Carl Hamacher, Zvonko. G. Varansic Safwat G. Zaky – Computer Organization – Mc Graw – Hill companies, Inc. - Unit 2 & Unit 3.
2. Barry B Brey – The Intel Microprocessor Systems: The 8086 / 8088 family architecture, programming and designing – PHI Publication.
3. John Uffenbeck, Micro Computers and Microprocessor, PHI.
4. Cyber Tech Educational Series web designing, Lokesh Vats.
5. Digital fundamentals, Thomas L Floyd UBS Publications.

SEMESTER: V
COMPUTER SCIENCE
(Practical based on Paper 5)
Practical Paper 5: CPU ARCHITECTURE AND MICROPROCESSOR.
PRACTICAL: 40 + 10 (IA)
Practical Hours: 14 Weeks x 2Hrs =28 Hrs

Scheme of Valuation:

One Program from Each Paper 5 and Paper 6.

Paper 5 Carries 15 Marks.

Paper 6. Carries 15 Marks.

Viva Carries 10 Marks.

COVERAGE FROM PAPER 5

1. Program to swap two data using
 - a. Register Mode.
 - b. Direct Mode.
 - c. Indirect Mode.
2. Addition of two 8 bits numbers.
3. Subtraction of two 8 bits numbers.
4. Multiplication of two 8 bits numbers.
5. Division of two 8 bits numbers.
6. Program to check whether the given number is odd or even.
7. Program to check whether the given number is positive or negative.
8. Program to find 1's and 2's complement of a given number.
9. Addition of two 16 bits numbers
 - a. Using DAD
 - b. With out using DAD.
10. Subtraction of two 16 bits numbers.
11. Addition of two 24 bits numbers.
12. Find the largest of N numbers.
13. Find the smallest of N numbers.
14. Program to generate Fibonacci series of length N using delay.
15. Program to sort N numbers in ascending order using delay.
16. Program to sort N numbers in descending order using delay.
17. Program to display Decimal Up /Down Counter using delay.

SEMESTER-V
COMPUTER SCIENCE
Paper 6: COMPUTER NETWORKS and DATA COMMUNICATION-16ME282
THEORY: 80 +20(IA)
Teaching Hours 16 Weeks x 3Hrs =48 Hrs

UNIT-I	Data Communication:- Introduction ,Characteristics – Delivery, accuracy, Timeliness and jitter , Components – Message, sender, receiver, transmission medium and Protocol Line Configuration – Point to point and multi point Topology – Mesh, Star, Tree, Bus, Ring, and fly bird Transmission Model – Simplex, half duplex, Full Duplex Types of Networks – LAN, WAN, MAN, and Intranet network& internetworking devices – Repeater, bridges, types of bridges, Routers, Gateways. Transmission Media – An Introduction, Guided Media: - Twisted pair cable – Unshielded and shield twisted pair cable, co-axial cable, optical fiber cable Unguided Media :- Radio waves – propagation (Ground, sky and line of sight) micro waves satellite communication, cellular telephony with their application Multiplexing :- FDM, TDM and applications	16hrs
UNIT-II	The OSI model – Layered architecture, Functions of the layers – Physical layer, Data link layer, Network layer, Transport layer, Session layer, Presentation layer, Application layer. Electronic mail - simple mail transfer protocol (SMTP), simple network management protocol (SNMP),hypertext transfer protocol (HTTP). TCP/IP – TCP/IP protocol suite layer internet work protocol other protocols in the network layer – ARP, RARP,ICMP& IGMP Transport layer - user datagram protocol (UDP) and transmission control protocol (TCP) Application layer - Domain name system (DNS)(797) file transfer protocol	16 hrs
UNIT – III	Data and Signals: Analog and digital -Analog and digitaldata, Analog and digital Signals. Periodic Analog signals –sine wave, phase, wavelength, time and frequency domains, composite signals and bandwidth Digital Signals – Bitrate, bit length, transmission of digital signals. Error Detection and Correction – Introduction, Block coding, linear block-codes, cyclic codes, checksum Digital Transmission:- Analog to digital conversion – Pulse code Modulation (PCM),delta modulation(DM) Digital to Analog conversion – Amplitude shift key (ASK), frequency shift key, phase shift key (PSK) Text Book: 1. Communication networks : II edition. : Albert Leon Gaitia, Indrawidjaja 2. Computer Networks: Tanenbaum IV Edition 3. Introduction to Data Communications and Networking by BEHROUZ FOROUZAN	16 hrs

SEMESTER: V
COMPUTER SCIENCE
(Practical based on Paper 6)
Practical Paper 6: COMPUTER NETWORKS and DATA COMMUNICATION
PRACTICAL: 40 + 10 (IA)
Practical Hours: 14 Weeks x 2Hrs =28 Hrs

List of problems on Networking to be conducted in the lab:

1. Write a C program to sort 'n' Frame Buffers in ascending order.
2. Write a C program to find Minimum Spanning Tree for a Graph.
3. Write a C program to Encode and Decode the number 688 using RSA Algorithm choose $p = 47$, $q = 71$, and $e = 79$.
4. Write a C program to implement Leaky Bucket Algorithm with bucket size 50 and rate of discharge 30. Simulate for 5 packets.
5. Write a C program to create a Server and Client process where Client makes a request for a file and Server sends the information to Client. Assume file contains only one line.
6. Create a Website to add two web pages using HTML.
7. Create an Email Account.
8. Create a Topology with three Nodes 1, 2, and 3 connected to a Hub. Set TCP connection from 1 to 3 and UDP connection from 2 to 3.
9. Demonstrate FTP and Telnet protocols with 4 Nodes, 2 Hubs and 1 Router.
10. Create a Topology with two Nodes connected to a Hub with Point-to-Point link and vary the Bandwidths and observe the Throughput and Drop packets.
11. Write a C program to sort 'n' Frame Buffers in ascending order.
12. Write a C program to find Minimum Spanning Tree for a Graph.
13. Write a C program to Encode and Decode the number 688 using RSA Algorithm choose $p = 47$, $q = 71$, and $e = 79$.
14. Write a C program to implement Leaky Bucket Algorithm with bucket size 50 and rate of discharge 30. Simulate for 5 packets.
15. Write a C program to create a Server and Client process where Client makes a request for a file and Server sends the information to Client. Assume file contains only one line.
16. Create a Topology with three Nodes 1, 2, and 3 connected to a Hub. Set TCP connection from 1 to 3 and UDP connection from 2 to 3.
17. Demonstrate FTP and Telnet protocols with 4 Nodes, 2 Hubs and 1 Router.
18. Create a Topology with two Nodes connected to a Hub with Point-to-Point link and vary the Bandwidths and observe the Throughput and Drop packets.
19. Create a topology with two Routers of 2500 series routers. Set the IP Address for the Ethernet and Serial Interfaces. Enable the RIP Protocol to both the Routers. Demonstrate the connectivity between 2 Routers with 'ping' command

SEMESTER-VI
COMPUTER SCIENCE
Paper 8: ADV JAVA -16MF280
THEORY: 80 + 20 (IA)

Teaching Hours 16 Weeks x 3Hrs =48 Hrs

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|------------------|--|--------------|
| UNIT I: | Introduction to Java: Java and Java applications; Java Development Kit (JDK); Java is interpreted, Byte Code, JVM; Object-oriented programming; Simple Java programs. Data types and other tokens: Boolean variables into, long, char, operators, arrays, white spaces, literals, assigning values; Creating and destroying objects; Access specifiers. Operators and Expressions: Arithmetic Operators, Bitwise operators, Relational operators, The Assignment Operator, The ? Operator; Operator Precedence; Logical expression; Type casting; Strings Control Statements: Selection statements, iteration statements, Jump Statements. | 6 hrs |
| UNIT II: | Classes, Inheritance, Exceptions, Applets : Classes: Classes in Java; Declaring a class; Class name; Super classes; Constructors; Creating instances of class; Inner classes. Inheritance: Simple, multiple, and multilevel inheritance; Overriding, overloading. Exception handling 7hours Exception handling in Java. The Applet Class: Two types of Applets; Applet basics; Applet Architecture; An Applet skeleton; Simple Applet display methods | 6 hrs |
| UNIT III: | Multi Threaded Programming: What are threads? Lifecycle of a thread. Event Handling: Two event handling mechanisms; The delegation event model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Adapter classes; Inner classes. | 7 hrs |
| UNIT IV: | Java 2 Enterprise Edition Overview, Database Access: Overview of J2EE and J2SE.The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Java Data base connectivity – 2 tier, 3 tier architecture Servlets: Background; The Life Cycle of a Servlet; Development; A simple Servlet; Introduction of cookies; File and IO streams | 3 hrs |

Text Books:

1. Complete Reference Java By Patrick Norton
2. Java 2 Complete – BPB Publications.
3. Java Workshop – Steven Holzner
4. Advanced Java -- Unleashed

Reference:

1. Thinking in Java by Bruce Ecnel

SEMESTER -VI
COMPUTER SCIENCE
Paper 9: OPERATING SYSTEM and SYSTEM SOFTWARE - 16MF282
THEORY: 80 + 10 (IA)
Teaching Hours 16 Weeks x 3Hrs =48 Hrs

UNIT 1: Fundamentals of Operating System: An introduction, History, Types of operating system, multi-user, single user, batch systems, multitasking, multiprogramming, real time systems. **16Hrs.**
Operating System functions / services, System Calls, System Programs.
Memory Management – Swapping, Single Contiguous Technique, Partitioned allocation, Paging, Segmentation with paging, Demand paging.

UNIT II: Process Management – Process concept, Process state, Process control block. **16Hrs.**
CPU Scheduling CPU - I/O burst cycle, CPU schedulers, Scheduling queues, Scheduling criteria.
Process synchronization – Spooling, Semaphores.
Deadlocks – Characterization, Methods for handling deadlocks, Deadlock Prevention - Mutual exclusion, hold and wait, no pre-emption, circular wait. Deadlock avoidance – Safe state, Banker's algorithm. Deadlock detection, single and several instances of resources type.

UNIT III: System Software – Introduction. **16 Hrs**
Assembler – Functions, Pass 1 and Pass 2 (without designing; only purposes).
Loaders – General loading scheme, Types of loading scheme, compile-and-go (without designing), absolute loaders (with designing), direct-linking loaders (without designing).
Compilers – Functions, Phases and compilers, lexical analysis, interpretation, syntax analysis, Optimization, storage assignment, code generation, assembly and output, Lexical and syntax analysis (in detail).

Text Books:

UNIT 1 & UNIT II:

1. A. Silberschatz and Galvin – Operating System Concepts, John Wiley and sons Publication.

(Chapters: 1.1, 1.2, 1.3, 1.4, 1.8, 3.2, 3.3 3.4, 4.1, 4.2.1, 5.1, 5.2, 5.3, 6.4, 7.2, 7.3, 7.4, 7.5, 7.6, 8.3, 8.4, 8.5, 8.7, 9.2, 13.2, 13.3, 13.4)

UNIT III:

1. John J Donovan – System Programming, Tata McGraw- Hill.

(Chapters: 3.2.1, 5.1, 5.1.1, 5.1.3, 5.1.6, 5.2, 8.1, 8.1.6, 8.2.1, 8.2.2)

Reference:

1. Operating System and System Programming by Dhamdhere, Tata McGraw-Hill Publishing.
2. Operating System by Tannenbaum.
3. Operating System by Godbole, Tata McGraw-Hill Publication.

SEMESTER: VI
COMPUTER SCIENCE
(Practical based on Paper 8 and Paper 9)
Practical Paper 8: ADV JAVA PROGRAMS ((16MF284)
PRACTICAL: 40 + 10 (IA)
Practical Hours: 16 Weeks x 3Hrs =48 Hrs

Scheme of Practical Examination& valuation

- 1. Practical Proper: 40 marks (Practical - 35 + Viva -05 =40)**
- 2. Internal Assessment: Practical record - 05 + Practical test-05=10)**

1. Write a Java program to demonstrate Printing in Java
2. Write a Java Program to perform basic arithmetic operations.
3. Write a Java program to demonstrate Classes and objects
4. Write a Java program to demonstrate constructor –default
5. Write a Java program to demonstrate Function overloading.
6. Write a Java program to demonstrate constructor overloading.
7. Write a Java program to illustrate One dimensional array
8. Write a Java program to demonstrate two dimensional array
9. Write a Java program to get current date and time using calendar
10. Write a java program to generate random number using math class
11. Write a Java program to find quadric equation by accepting input from keyboard
12. Write a Java program to demonstrate Single Inheritance.
13. Write a Java program to demonstrate Multiple Inheritance.
14. Write a Java program to demonstrate Multilevel Inheritance.
15. Write a Java program to demonstrate Hybrid Inheritance.
16. Write a applet program for free hand drawing
17. Write a Applet program to Read line of characters from console using InputStream
18. Write a Applet program to develop a simple calculator.
19. Write a Java program to find ip address of your system.
20. Write a java applet to print hello word in different colors
21. Write a Java program to Illustrate threads.
22. Write a Java program to Exception Handling.
23. Write a java program to illustrate packages
24. Write a Java program to demonstrate JDBC
25. Write a Java program to demonstrate Servlets
26. Write a Java program to demonstrate RMI

**SEMESTER VI
COMPUTER SCIENCE
Practical Paper 9: LINUX AND SHELL PROGRAMMING
and
PROJECT WORK**

16MF286

Marks Distribution

Part A: Practical 20 + 10 (IA).

Part B: Project - 20

Practical & Project Hours: 16 Weeks x 3Hrs =48 Hrs

Scheme of Practical Examination/ Valuation

Part A: Practical Proper: 20 marks (Practical - 15 + Viva -05 =20).

Any Two Programs Carries 15 Marks

Internal Assessment: Practical record - 05 + Practical test-05=10)

Part B: Project work: Project Evaluation-10 + Presentation-10 =20

List of Experiments to be conducted in the lab:

1. Write a shell script to exchange the contents of two variables.
2. Write a shell script, which accepts three subject marks scored by a student and declare the result.
3. Write a shell script to print integer numbers from 1 to 20.
4. Write a shell script to perform arithmetic operation on two number depending on +, -, * and /.
5. Write an interactive shell script to display a menu and perform the following task:
 - i. Renaming a file
 - ii. Deleting a file
 - iii. Copying a file
 - iv. Exit
6. Write a shell script which counts the number of lines in a file.
7. Write a shell script to accept three command line arguments and display each one of them.
8. Write a c program to
 - b. Display the PID of parent and PID of child.
 - d. Copy the contents of one file into the other using command line arguments.
9. Write a c program to write a simple editor which serves the following purposes:
 - ii. Cursor movement in all directions.
 - iv. Insert a new line and a character.
 - vi. Deletion of line and a character.
10. Assume a file with following information

FirstName	MiddleName	Age
-----	-----	-----
Shashank	Nayak	02
Prem	Singh	44
Shiva	Kumar	21
Guru	Raj	50
Augustin	Minalkar	35
Krishna	Kumar	30

Write a shell script

- ii. To Sort the first name in alphabetical order.
- iv. Sort the age in terms of ascending order.

- vi. Sort the age in terms of descending order.
 - viii. Sort the middle name in alphabetical order.
11. Write a c program to identify the different category of tokens that are present in a file TEST.C
- j. Keywords (like int, float, char, double).
 - ii. Literals (like 10, 20.4, “abc”).
 - iii. Identifiers (like int a, b, c).
12. Write a Shell script to display
- i. The version of the shell.
 - ii The user information.
 - iii. Login date and time.
 - iv List of processes running on the system.
 - v User home directory

Reference:

- 1.UNIX Shell Programmes - Interactive Workbook by Christopher Vickey.
- 2.A user guide to UNIX system by Dr. Rebecca Thomas Jean Yates.

COMPUTER SCIENCE: PROJECT WORK

Part B: Project work: Project Evaluation-10 + Presentation-10 =20

PROJECT GROUP: The group shall contain a maximum of two students

Students are advised to take up the project outside the College in consultation with the in charge faculty. Monthly report to be submitted to the in charge faculty. Final project report to be submitted to the in charge faculty and to be submitted to the HOD before presenting in the final examination.

SUGGESTED AREAS

1. College/School Management Software
- 2 Hospital Management
- 3 Hotel Management
- 4 Library Management
- 5 Bank Management
- 6 Finance Management
- 7 Airline Reservation
- 8 Road Transport Reservation
- 9 Electricity Billing
- 10 Industry & Commerce
- 11 Share Market
- 12 Web site creation of an organization
- 13 Web based database project
- 14 Creating a e-commerce web site
- 15 Project on data mining and data warehouse
- 16 E-governance

PLATFORM**HARDWARE**

Personal computer of latest make & any server.

SOFTWARE

Operating System: Latest LINUX/Windows release, VB, Java, Power Builder, LINUX development tool or any latest tool, Web designing tool, HTML editors.

DATABASE

Oracle/Access/Sybase/ MYSQL/ POSTGRE SQL/Informix /DB2or any other latest RDBMS.

GENERAL STUDIES - MC201/MD201

B.Sc COMPUTER SCIENCE

SOFTWARE ENGINEERING

THEORY: 60 + 10 (IA)

Teaching Hours 16 Weeks x 3Hrs =48 Hrs

- UNIT I: Introduction :** Role of Software Engineering in System Design, History of Software Engineering **16 hrs**
Role of Software Engineer, Relationship of Software Engineering to other areas of Computer Science, Programming Languages, Operating System, Databases
Software Life Cycle Models, Waterfall Model , V mode, Iterative Waterfall Model
Prototyping Model, Evolutionary Model, Spiral Model
Requirement Analysis and Specification: Requirement Analysis, Software Requirement and Specification (SRS), SRS Document, Characteristics of SRS Document, Organization of SRS Document.
- UNIT II: Software Design:** Software Design, Cohesion and Coupling, Classification of Cohesiveness, Classification of Coupling, Software Design Approaches- Function Oriented Design & Object Oriented Design. **16 hrs**
User Interface Design: Characteristics, Basic Concepts-User Guidance, Mode based V/s Modeless Interface, GUI V/s Text Based User Interface, Types of User Interface.
Coding: Coding Standards & Guidelines, Code Walk Throughs, Code Inspection, Software Documentation.
- UNIT III: Testing** **16 hrs**
What is Testing, Verification V/s Validation, Design of Test Cases, Test report, Stub Models, Block box testing, White Box Testing, Debugging, Program Analysis Tool, Integration: Drivers, stubs, stub models, Categories of testing,
Testing Types: Regression testing, performance testing, stress testing, security testing, volume testing, load testing, static testing, dynamic testing, Unit testing, Integration testing.
Bug, Bug tracking tool, Bug life cycles.
Introduction to: Quality Analysis, Quality Control: Activities
Introduction to: SQA: CMM, ISO, Matrices, And Functionality & Performance
Automation – Necessity of Automation, advantages of Automation. Different Automation tools.
Reference Books
Fundamentals of Software Engineering - Pressmen
Fundamentals of Software Engineering - Carlo Ghazzi
Fundamentals of Software Engineering - Rajib Mall

**Practical: SOFTWARE ENGINEERING LAB
(GENERAL STUDIES)**

Practical Hours 16 Weeks x 2Hrs =32 Hrs

Students has to prepare the test cases for the given exe file and to perform functionality testing
