



SURI VIDYASAGAR COLLEGE

(Govt. Sponsored & Constituent college of the University of Burdwan)

SURI, BIRBHUM, PIN – 731101, Ph. No. – 03462-255504

Website: surividyasagarcollege.org.in, e-mail: : surividyasagarcollege1942@gmail.com

This Institution is Ragging Free

5.1.2 Following capacity development and skills enhancement activities are organized for improving students' capability

ICT and computing skill enhancement programmes: The undergraduate curriculum of different subjects is designed to enhance computer skills, and hence the faculty of the respective departments of Suri Vidyasagar College taught and trained the students.





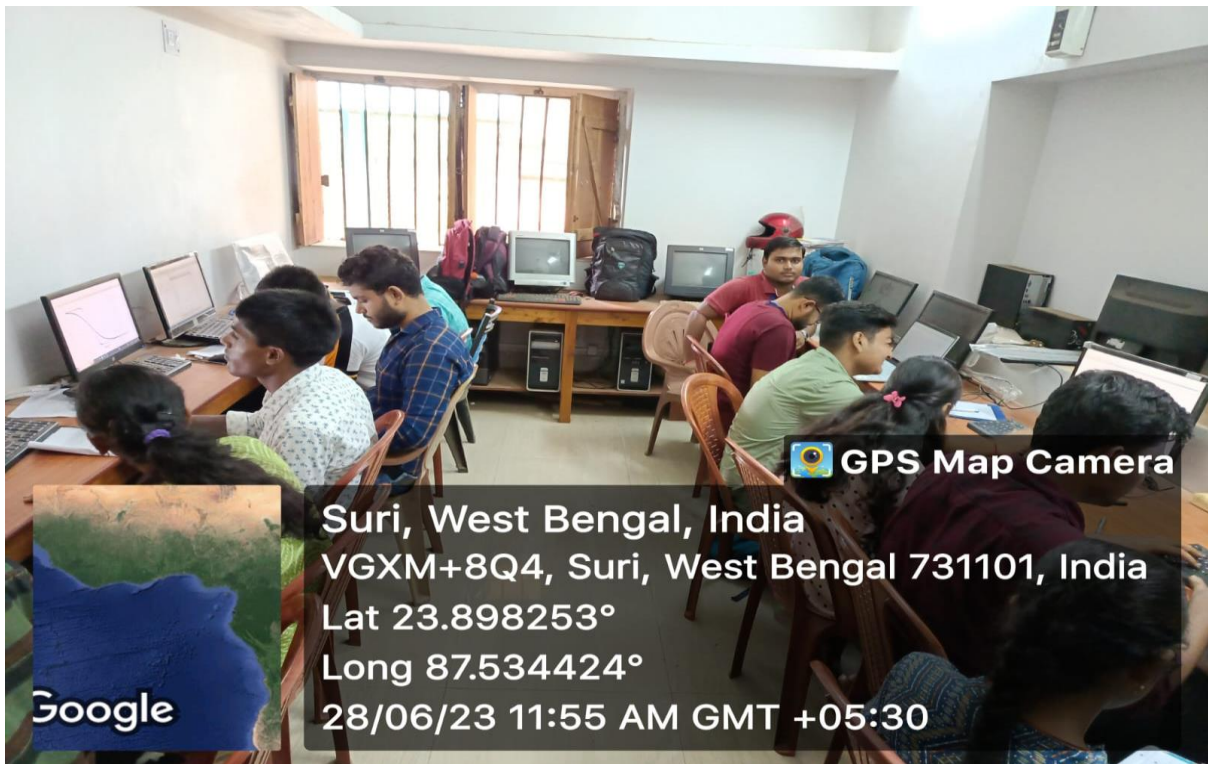
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VGXM+4R4 vidysagar college, Suri, West Bengal 731101, India

Lat 23.898163°

Long 87.534471°

19/06/24 12:46 PM GMT +05:30

Semester wise Course Structures

Sem ester	Course Type	Course Code	Name of the Course	Credit Pattern (L:T:P)	Total class hrs./week	Marks	Credit	
I	CC	BMH1CC01	Calculus, Geometry & Differential Equations	5:1:0	6	75	6	
		BMH1CC02	Algebra	5:1:0	6	75	6	
	AECC		Environmental Studies	4:0:0	4	100	4	
	GE		To be offered by other discipline.				6	
II	CC	BMH2CC03	Real Analysis	5:1:0	6	75	6	
		BMH2CC04	Differential Equations and Vector Calculus	5:1:0	6	75	6	
	AECC		English/Modern Indian Language	2:0:0	2	50	2	
	GE		To be offered by other discipline.				6	
III	CC	BMH3CC05	Theory of Real Functions & Introduction to Metric Spaces	5:1:0	6	75	6	
		BMH3CC06	Group Theory I	5:1:0	6	75	6	
		BMH3CC07	Numerical Methods & Numerical Methods Lab	4:0:2	8	75 (50+25)	6	
		Choose any one from the following courses for Skill Enhancement Courses (SECs).						
	SEC	BMH3SEC11	Logic and Sets	2:0:0	2	50	2	
		BMH3SEC12	Computer Graphics	2:0:0	2	50	2	
		BMH3SEC13	Object Oriented Programming in C++	2:0:0	2	50	2	
GE		To be offered by other discipline.				6		
IV	CC	BMH4CC08	Riemann Integration and Series of Functions	5:1:0	6	75	6	
		BMH4CC09	Multivariate Calculus	5:1:0	6	75	6	
		BMH4CC10	Ring Theory and Linear Algebra I	5:1:0	6	75	6	
		Choose any one from the following courses for Skill Enhancement Courses (SECs).						
	SEC	BMH4SEC21	Graph Theory	2:0:0	2	50	2	
		BMH3SEC22	Operating System (Linux)	2:0:0	2	50	2	
		BMH3SEC23	MATLAB Programming	2:0:0	2	50	2	
GE		To be offered by other discipline.				6		



The University of Burdwan
B.Sc. General in Computer Science
CBCS w.e.f. 2017 – 2018

SEMESTER – I

Course code	Course title	Credit	No of Hours		
			L	T	P
CC-1A	Problem solving Using Computer	4-0-2=6	4	0	4
	Discipline 2	6		-	
	Discipline 3	6			
	AECC1:Environmental studies	4			
		22			

SEMESTER – II

Course code	Course title	Credit	No of Hours		
			L	T	P
CC-1B	Database Management Systems	4-0-2=6	4	0	4
	Discipline 2	6			
	Discipline 3	6			
	AECC 2: ENG/MIL	2			
		20			

SEMESTER – III

Course code	Course title	Credit	No of Hours		
			L	T	P
CC-1C	Operating Systems	4-0-2=6	4	0	4
	Discipline 2	6			
	Discipline 3	6			
SEC-1 (Computer Science)	Office Automation Tools OR System Administration and Maintenance	1-0-1=2	1	0	2
		20			

SEMESTER – IV

Course code	Course title	Credit	No of Hours		
			L	T	P
CC-1D	Computer System Architecture	4-0-2=6	4	0	4
	Discipline 2	6			
	Discipline 3	6			
SEC-2 (Computer Science)	HTML Programming OR XML Programming	1-0-1=2	1	0	2
		20			

SEMESTER – V

Course code	Course title	Credit	No of Hours		
			L	T	P
DSE 1A	Programming in Java OR Software Engineering	4-0-2=6	4	0	4
DSE 2A	Discipline 2	6			
DSE 3A	Discipline 3	6			
SEC-3 (Computer Science)	MySQL / PL-SQL OR Concepts of Software Testing	1-0-1=2	1	0	2
		20			

SEMESTER – VI

Course code	Course title	Credit	No of Hours		
			L	T	P
DSE 1B	Computer Networks OR Internet Technologies	4-0-2=6	4	0	4
DSE 2B	Discipline 2	6			
DSE 3B	Discipline 3	6			
SEC-4 (Computer Science)	PHP Programming OR Programming in Visual Basic	1-0-1=2	1	0	2
		20			

Core Course (CC):

CC-1A: Problem Solving using Computer

CC-1B: Database Management Systems

CC-1C: Operating Systems

CC-1D: Computer System Architecture

SEC (Skill Enhancement Course)

SEC 1: Office Automation Tools

Or

System Administration and Maintenance

SEC 2: HTML Programming

Or

XML Programming

SEC 3: MySQL / PL-SQL

Or

Concepts of Software Testing

SEC 4: PHP Programming

Or

Programming in Visual Basic

Discipline Specific Electives –

(2 papers to be selected, 6 credit each, DSE 1A to DSE 2B)

DSE-1A (Any one of the following)

- a. Programming in Java
- b. Software Engineering

DSE-1B (Any one of the following)

- a. Computer Networks
- b. Internet Technologies

Semester-I

CC-1A: Problem Solving using Computer

Theory: 60 Lectures

Credit: 4

Computer Fundamentals:

Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers. (3L)

Basic Computer Organization: Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices. (4L)

Planning the Computer Program:

Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. (3L)

Techniques of Problem Solving:

Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming. (4L)

Overview of Programming:

Structure of a Python Program, Elements of Python (4L)

Introduction to Python:

Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit-wise operator, Increment or Decrement operator). (8L)

Creating Python Programs:

Input and Output Statements, Control statements (Looping- while loop, for loop , loop Control, Conditional Statement, if...else , Difference between break, continue and pass). (10L)

Structures:

Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments. (10L)

Introduction to Advanced Python:

Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming. (14L)

Reference Books:

1. P. K. Sinha & Priti Sinha , “Computer Fundamentals”, BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. T. Budd, Exploring Python, TMH, 1st Ed, 2011
4. Python Tutorial/Documentation www.python.org 2010
5. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
6. <http://docs.python.org/3/tutorial/index.html>
7. <http://interactivepython.org/courselib/static/pythonds>
8. <http://www.ibiblio.org/g2swap/byteofpython/read/>

Section: A (Simple programs)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :
 - Grade A: Percentage ≥ 80
 - Grade B: Percentage ≥ 70 and < 80
 - Grade C: Percentage ≥ 60 and < 70
 - Grade D: Percentage ≥ 40 and < 60
 - Grade E: Percentage < 40
3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms: $1 - 2/2! + 3/3! - \dots - n/n!$
7. WAP to calculate the sum and product of two compatible matrices.

Section: B (Visual Python):

All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects
 - I. curve
 - II. sphere
 - III. cone
 - IV. arrow
 - V. ring
 - VI. Cylinder.
2. WAP to read n integers and display them as a histogram.
3. WAP to display sine, cosine, polynomial and exponential curves.
4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula $m=60/(t+2)$, where t is the time in hours. Sketch a graph for t vs. m, where $t \geq 0$.
6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:
$$P(t) = (15000(1+t))/(15 + e^t)$$
where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
 - I. velocity wrt time ($v=u+at$)
 - II. distance wrt time ($s=u*t+0.5*a*t*t$)
 - III. distance wrt velocity ($s=(v*v-u*u)/2*a$)

Semester-II

CC-1B: Database Management Systems

Theory: 60 Lectures

Credit: 4

Introduction to Database Management Systems: Characteristics of database approach, data models, DBMS architecture and data independence. (10L)

Entity Relationship and Enhanced ER Modeling: Entity types, relationships, SQL- 99: Schema Definition, constraints, and object modeling. (15L)

Relational Data Model: Basic concepts, relational constraints, relational algebra, SQL queries. (15L)

Database design: ER and EER to relational mapping, functional dependencies, normal forms up to third normal form. (20 L)

Software Lab based on Database Management Systems

Credit: 2

Note: MS Access/MySQL may be used.

The following concepts must be introduced to the students:

DDL Commands

- Create table, alter table, drop table

DML Commands

- Select , update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or,

not,=,<>,>,<,>=,<=)

- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not

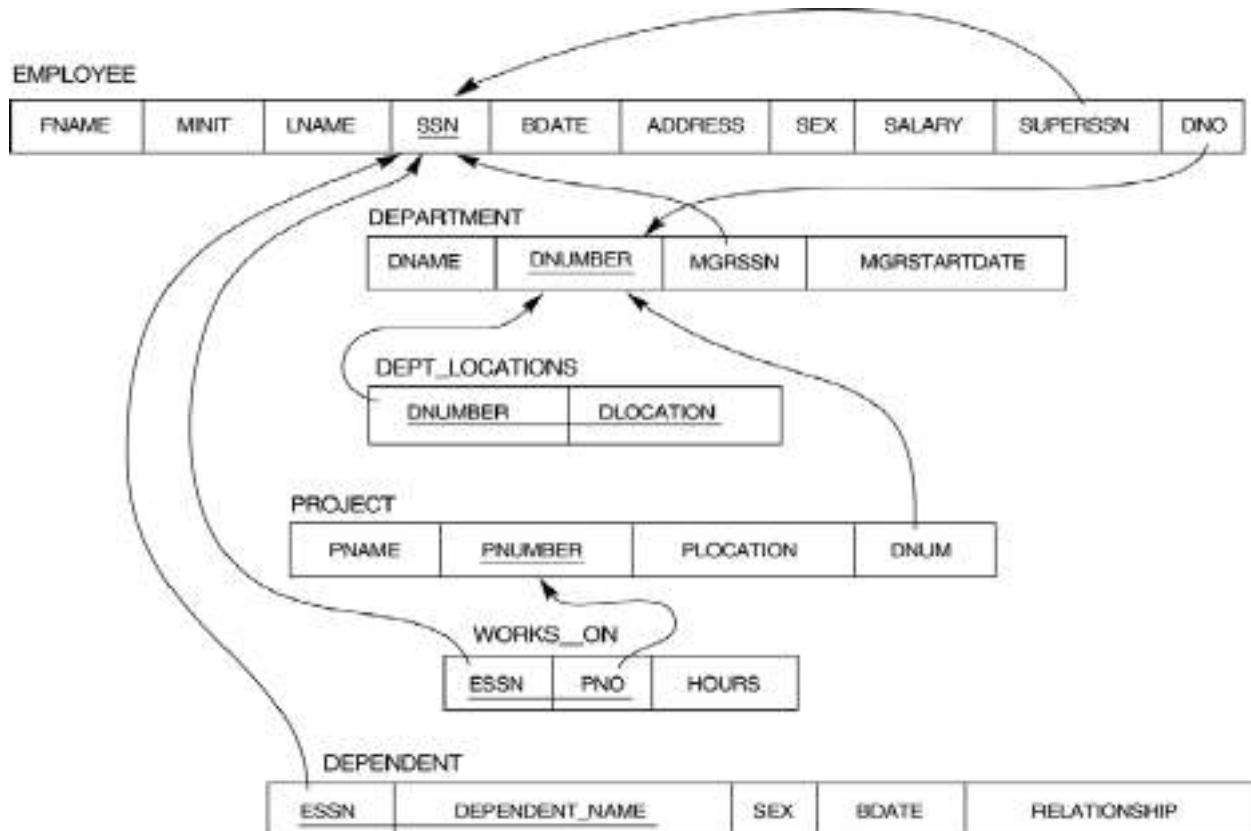
exists, union, intersect, minus, etc.)

- Categorization using group by.....having
- Arranging using order by

Reference Books:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. 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.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education,2013.

Relational Database Schema - COMPANY



Questions to be performed on above schema

1. Create tables with relevant foreign key constraints
2. Populate the tables with data
3. Perform the following queries on the database :
 1. Display all the details of all employees working in the company.
 2. Display ssn, lname, fname, address of employees who work in department no 7.
 3. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
 4. Retrieve the name and salary of every employee
 5. Retrieve all distinct salary values
 6. Retrieve all employee names whose address is in 'Bellaire'
 7. Retrieve all employees who were born during the 1950s
 8. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
 9. Retrieve the names of all employees who do not have supervisors
 10. Retrieve SSN and department name for all employees
 11. Retrieve the name and address of all employees who work for the 'Research' department
 12. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.
 13. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
 14. Retrieve all combinations of Employee Name and Department Name
 15. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.

16. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
17. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
18. Select the names of employees whose salary does not match with salary of any employee in department 10.
19. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
20. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
21. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
22. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
23. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
24. For each department, retrieve the department number, the number of employees in the department, and their average salary.
25. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
26. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively.
27. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
28. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary insertion in the Department table.
29. Delete all dependents of employee whose ssn is '123456789'.
30. Delete an employee from Employee table with ssn = '12345'(make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL
31. Perform a query using alter command to drop/add field and a constraint in Employee table.

Semester-III

CC-1C: Operating Systems

Theory: 60 Lectures

Credit: 4

Introduction: System Software, Resource Abstraction, OS strategies. (2L)

Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems. (2L)

Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs. (10L)

Process Management : System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model (15L)

Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies. (12L)

Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory (12L)

Shell introduction and Shell Scripting (7L)

- What is shell and various type of shell, Various editors present in linux
- Different modes of operation in vi editor
- What is shell script, Writing and executing the shell script
- Shell variable (user defined and system variables)
- System calls, Using system calls
- Pipes and Filters
- Decision making in Shell Scripts (If else, switch), Loops in shell
- Functions
- Utility programs (cut, paste, join, tr , uniq utilities)
- Pattern matching utility (grep)

Books Recommended:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles , 5th Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

Note: Following exercises can be performed using Linux or Unix

1. Usage of following commands:
ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands:
cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands:
chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of “who” command along with the total number of users.
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
12. Write a shell script to find the sum of digits of a given number.
13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
14. Write a shell script to find the LCD(least common divisor) of two numbers.
15. Write a shell script to perform the tasks of basic calculator.
16. Write a shell script to find the power of a given number.
17. Write a shell script to find the factorial of a given number.
18. Write a shell script to check whether the number is Armstrong or not.
19. Write a shell script to check whether the file have all the permissions or not.
20. Program to show the pyramid of special character “*”.

SEC-1 : Office Automation Tools

Theory: 20 Lectures

Credit: 2

Introduction to open office/MS office/Libre office (2L)

Word Processing: Formatting Text, Pages, Lists, Tables (6L)

Spreadsheets: Worksheets, Formatting data, creating charts and graphs, using formulas and functions, macros, Pivot Table (6L)

Presentation Tools: Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations (6L)

Books Recommended:

1. Sushila Madan , Introduction to Essential tools,JBA,2009.
2. Anita Goel, Computer Fundamentals, Pearson, 2012

Computer Lab Based on Office Automation:

Practical List for WORD:

1. Create a **telephone directory**.
 - The heading should be 16-point Arial Font in bold
 - The rest of the document should use 10-point font size
 - Other headings should use 10-point Courier New Font.
 - The footer should show the page number as well as the date last updated.
2. Design a time-table form for your college.
 - The first line should mention the name of the college in 16-point Arial Font and should be bold.
 - The second line should give the course name/teacher's name and the department in 14-point Arial.
 - Leave a gap of 12-points.
 - The rest of the document should use 10-point Times New Roman font.
 - The footer should contain your specifications as the designer and date of creation.
3. Create the following one page documents.
 - (a) Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.
 - (b) Design a certificate in landscape orientation with a border around the document.
4. Create the following document: A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.

5. Convert following text to a table, using comma as delimiter

Type the following as shown (do not bold).

Color, Style, Item

Blue, A980, Van

Red, X023, Car

Green, YL724, Truck

Name, Age, Sex

Bob, 23, M

Linda, 46, F

Tom, 29, M

6. Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06.
- Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
 - The headings of the columns should be in 12-point and bold.
 - The rest of the document should be in 10-point Times New Roman.
 - Leave a gap of 12-points after the title.
7. XYZ Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.
- (a) The title of the book should appear in bold using 20-point Arial font.
 - (b) The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - (c) At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - (d) The details of the offices of the publisher (only location) should appear in the footer.
8. Create the following one page documents.
- a) Design a Garage Sale sign.
 - b) Make a sign outlining your rules for your bedroom at home, using a numbered list.
9. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Amit	1327	1423	1193
Shivi	1421	3863	2934
Om	5214	3247	5467
Ananya	2190	1278	1928
Anupama	1201	2528	1203
Maharshi	4098	3079	2067

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

Practical List for EXCEL

Q1. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using:-

- i) Copy/Paste
- ii) Embedding
- iii) Linking

Q2. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term1, term2 and term3. Create 4th worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers. Make the column headings bold and italic. The 4th worksheet should contain college name as the first line. Make it bold, italic and center it.

Q3. Using a simple pendulum, plot 1-T and 1-T² graph.

I	t1	t2	t3	Mean(t)	T=t/20	T ²
70						
80						
90						
100						

Q4. Consider the following employee worksheet:-

Full Name (First Last)	Grade 1/2/3	Basic Salary	HRA	PF	Gross	Net	(VA) Vehicle Allowance

HRA is calculated as follows:

Grade	HRA %(of Basic)
1	40%
2	35%
3	30%

Gross = Basic + HRA + VA

Net = Gross –PF

PF is 8% for all Grades

VA is 15000, 10000 and 7000 for Grades 1, 2 and 3.

- i) Find max, min and average salary of employees in respective Grade
- ii) Count no. of people where VA>HRA
- iii) Find out most frequently occurring grade.
- iv) Extract records where employee name starts with “A” has HRA>10000
- v) Print Grade wise report of all employees with subtotals of net salary and also grand totals. Use subtotal command.
- vi) Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.

Q5. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increase the sell of more of more items and getting the profit of Rs40,000/.Use Goal Seek of find out how many items you will have to sell to meet your profit figure.

Q6. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for P – V and P-I/V. Sample observations are:-

Pressure(P)	Volume (V)	I/V	PV	P/V
75	20			
78.9	19			
83.3	18			
88.2	17			

Q7. Plot the chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).

Q8. Create the following worksheet(s) containing an year wise sale figure of five salesmen in Rs.

Salesman	2002	2003	2004	2005
MOHAN	10000	12000	20000	50000
MITRA	15000	18000	50000	60000
SHIKHA	20000	22000	70000	70000
ROHIT	30000	30000	100000	80000
MANGLA	40000	45000	125000	90000

Apply the following Mathematical & Statistical functions:

- i) Calculate the commission for each salesman under the condition :-
 - a) If total sales is greater than Rs. 3, 00,000/-, then commission is 10% of total sale made by the salesman.
 - b) Otherwise, 4% of total sale.
- ii) Calculate the maximum sale made by each salesman.
- iii) Calculate the maximum sale made in each year.
- iv) Calculate the minimum sale made by each salesman.
- v) Calculate the minimum sale made in each year.
- vi) Count the no. of sales persons.
- vii) Calculate the cube of sales made by Mohan in the year 2002.
- viii) Find the difference in sales by salesman Mitra between the year 2002 and 2003.
Find the absolute value of difference.
- ix) Also calculate the Mode, Stddev, Variance, Median for the sale made by each salesman.
- ix) Calculate the year wise Correlation coefficient between the sales man Mohan and Mitra year wise

Q9. The following table gives an year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

- v) Calculate total sale year wise.
- vi) Calculate the net sales made by each salesman
- vii) Calculate the commission for each salesman under the condition :-
 - c) If total sales is greater than Rs. 4, 00,000/-, then commission is 5% of total sale made by the salesman.
 - d) Otherwise, 2% of total sale.
- viii) Calculate the maximum sale made by each salesman.
- ix) Calculate the maximum sale made in each year.
- x) Draw a bar graph representing the sale made by each salesman.
- xi) Draw a pie graph representing the sale made by salesmen in year 2001.

Q10. Consider the following worksheet for APS 1st year students:-

S.No.	Name	PH	CH	BY	MT	CS	Total Marks	%	Grade
1									
2									

Grade is calculated as follows:-

- If % \geq 90 Grade A
- If % \geq 80 & $<$ 90 Grade B
- If % \geq 70 & $<$ 80 Grade C
- If % \geq 60 & $<$ 70 Grade D

Otherwise students will be declared fail.

- i) Calculate Grade using if function
- ii) Sort the data according to total marks
- iii) Apply filter to display the marks of the students having more than 65% marks.
- iv) Draw a pie chart showing % marks scored in each subject by the topper of the class.
- v) Draw the doughnut chart of the data as in (iv)
- vi) Enter the S.No. of a student and find out the Grade of the student using VLOOKUP.
- vii) Extract all records where name
 - a) Begins with "A"
 - b) Contains "A"
 - c) Ends with "A"

Practical List for Power Point:

1. Create five Power point slides. Each slide should support different format. In these slides explain areas of applications of IT. Make slide transition time as 10 seconds.
2. Create five Power Point slides to give advantages/disadvantages of computer, application of computers and logical structure of computer.
3. Create five Power Point slides detailing the process of internal assessment. It should be a self-running demo.

SEC-1 : System Administration and Maintenance (1+2 Labs)

Theory: 20 Lectures

Credit: 2

Part I (Linux/Unix)

(10L)

- Basics of operating system, services,
- Installation and configuration, maintenance
- What is linux/unix Operating systems, Kernel, API, cli, gui,
- Difference between linux/unix and other operating systems
- Features and Architecture
- Linux features, advantages, disadvantages

Part II (Windows)

(10L)

- Windows as operating system, history, versions.
- PC hardware, BIOS, Devices and drivers,
- Kernal Configuration and building
- Application installation, configuration and maintenance
- Server services and Client services
- Difference between WindowsXP/windows7 and windows server 2003/2008

Software Lab Based on System Administration and Maintenance Linux:

Linux Desktop tour. Configuring desktop environment and desktop settings.

Basic Commands :Terminal, shell,Cat, ls, cd, date, cal, man, echo, pwd, Mkdir, rm, rmdir Ps, kill

Package Installation

Synaptic package manager

Windows:

Creating users – Admin and regular.

Path of their personal files. Adding and changing passwords. Difference between workgroup and domain. Concept of roles.

user profiles – creating and roaming Concept of Active Directory. Creating active directory in windows 2003/2008.

Process and Disk management

Windows Task manager. File systems – NTFS, FAT.

Services

Control Panel

C:/program Files, C:/system C:/windows

Add/remove new hardware (like printer), Add/remove new programmes.

Network Administration

Ipconfig,Ping, tracert, route, hostname, net, netstat, whoami

Set manual IP address, check connectivity – ipv4, ipv6

Administrator Tools

Control Panel -> Administrative Tools

Computer Management, Local security Policy, Performance Monitor, Task Scheduler, Antivirus and firewall.

Misc

Start->Accessories->System tools -> All options (Remote desktop, backup/restore etc.)

LAN – sharing printer, files and folder over the network.

Semester-IV:

CC- 1D: Computer System Architecture

Theory: 60 Lectures

Credit: 4

Introduction: Logic gates, boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexors, registers, counters and memory units. (12L)

Data Representation and basic Computer Arithmetic: Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison. (8L)

Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt. (18L)

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. (10L)

Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming. (8L)

Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access. (4L)

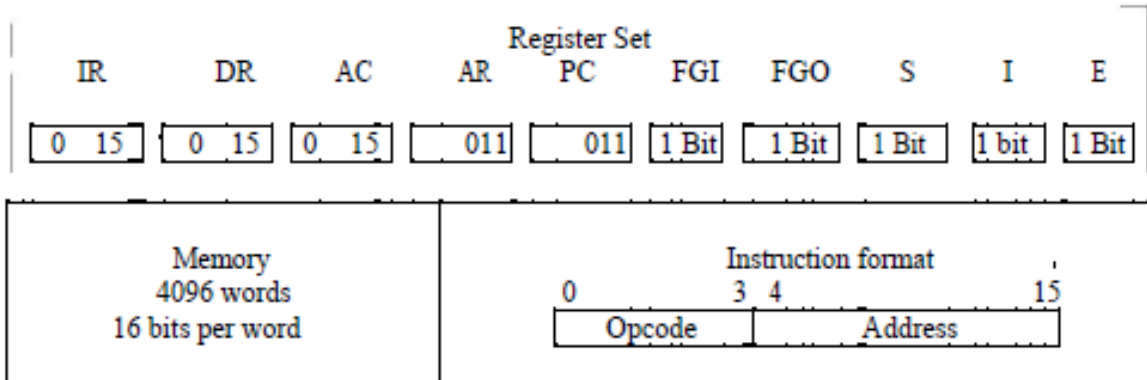
Books Recommended:

1. M. Mano, Computer System Architecture, Pearson Education 1992.
2. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004
3. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India ,2009
4. Digital Design, M.M. Mano, Pearson Education Asia, 1979

Computer System Architecture Lab

Practical: 60 Lab Periods

1. Create a machine based on the following architecture:



Basic Computer Instructions

Memory Reference		Register Reference		Input-Output	
Symbol	Hex	Symbol	Hex	Symbol	Hex
AND	0xxx	CLA	E800	INP	F800
ADD	2xxx	CLE	E400	OUT	F400
LDA	4xxx	CMA	E200	SKI	F200
STA	6xxx	CME	E100	SKO	F100
BUN	8xxx	CIR	E080	ION	F080
BSA	Axxx	CIL	E040	IOF	F040
ISZ	Cxxx	INC	E020		
AND I	1xxx	SPA	E010		
ADD I	3xxx	SNA	E008		
LDA I	5xxx	SZA	E004		
STA I	7xxx	SZE	E002		
BUN I	9xxx	HLT	E001		
BSA I	Bxxx				
ISZ I	Dxxx				

Optional

Refer to Chapter-5 of Morris Mano for description of instructions.

- ii) Create the micro operations and associate with instructions as given in the chapter (except interrupts). Design the register set, memory and the instruction set. Use this machine for the assignments of this section.
- iii) Create a Fetch routine of the instruction cycle.

iv) Simulate the machine to determine the contents of AC, E, PC, AR and IR registers in hexadecimal after the execution of each of following register reference instructions:

- | | | |
|--------|--------|--------|
| a. CLA | e. CIR | i. SNA |
| b. CLE | f. CIL | j. SZA |
| c. CMA | g. INC | k. SZE |
| d. CME | h. SPA | l. HLT |

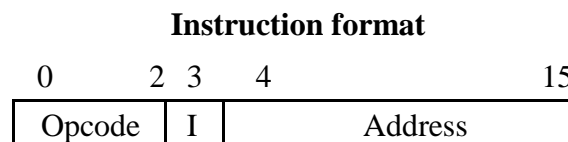
Initialize the contents of AC to $(A937)_{16}$, that of PC to $(022)_{16}$ and E to 1.

5. Simulate the machine for the following memory-reference instructions with $I=0$ and address part = 082. The instruction to be stored at address 022 in RAM. Initialize the memory word at address 082 with the operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.

- | | |
|--------|--------|
| a. ADD | f. BSA |
| b. AND | g. ISZ |
| c. LDA | |
| d. STA | |
| e. BUN | |

6. Simulate the machine for the memory-reference instructions referred in above question with $I=1$ and address part = 082. The instruction to be stored at address 026 in RAM. Initialize the memory word at address 082 with the value 298. Initialize the memory word at address 298 with operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.

7. Modify the machine created in Practical 1 according to the following instruction format:



- a. The instruction format contains a 3-bit opcode, a 1-bit addressing mode and a 12-bit address. There are only two addressing modes, $I=0$ (direct addressing) and $I=1$ (indirect addressing).
- b. Create a new register I of 1 bit.
- c. Create two new microinstructions as follows :
 - i. Check the opcode of instruction to determine type of instruction (Memory Reference/Register Reference/Input-Output) and then jump accordingly.
 - ii. Check the I bit to determine the addressing mode and then jump accordingly.

SEC – 2 : HTML Programming

Theory: 20 Lectures

Credit: 2

- **Unit-I: Introduction** (2L)
- **Unit-II: The Basics** (3L)
 - The Head, the Body
 - Colors, Attributes
 - Lists, ordered and unordered
- **Unit-III: Links** (3L)
 - Introduction
 - Relative Links, Absolute Links
 - Link Attributes
 - Using the ID Attribute to Link Within a Document
- **Unit-IV: Images** (3L)
 - Putting an Image on a Page
 - Using Images as Links
 - Putting an Image in the Background
- **Unit V: – Tables** (4L)
 - Creating a Table
 - Table Headers
 - Captions
 - Spanning Multiple Columns
 - Styling Table
- **Unit VI – Forms** (5L)
 - Basic Input and Attributes
 - Other Kinds of Inputs
 - Styling forms with CSS
 - Where To Go From Here

Book Recommended:

1. Introduction to **HTML** and CSS -- O'Reilly , 2010
2. Jon Duckett, HTML and CSS, John Wiely, 2012


Software Lab Based on HTML:

Q.1 Create an HTML document with the following formatting options:

- I. Bold
- II. Italics
- III. Underline
- IV. Headings (Using H1 to H6 heading styles)
- V. Font (Type, Size and Color)
- VII. Paragraph
- VIII. Line Break
- IX. Horizontal Rule
- X. Pre tag

Q.2 Create an HTML document which consists of:

- I. Ordered List
- II. Unordered List
- III. Nested List
- IV. Image



XYZ Ltd's Update

1. Introduction
2. Company Financial Update
 - o First Quarter
 - o Second Quarter
 - o Third Quarter
 - o Fourth Quarter
3. Advertising Update
 - o Result of Newspaper Campaign
 - o Additions to staff
 - o New Thoughts on Television
4. Human Resources Update

- A. Safety Considerations
 1. Body substance isolation
 2. Sense safety
 3. Initial size-up
- B. Initial Patient Assessment
 1. General Impression
 2. Unresponsiveness
 - i. Alert to person, place and time
 - ii. Verbal response to audible stimuli
 - iii. Pain evokes verbal or physical response
 - iv. Unresponsive to all stimuli
- C. Patient Critical Needs
 1. Airway
 2. Breathing
 - i. Use oxygen if indicated
 - ii. Consider use of assisting with bag value mask
 3. Circulation
 4. Bleeding

Q.3 Create an HTML document which implements Internal linking as well as External linking.

Q.4 Create a table using HTML which consists of columns for Roll No., Student's name and grade.

Result		
Roll No	Name	Grade

Q.5 Create a Table with the following view:

			Place an image here	

Q.6 Create a form using HTML which has the following types of controls:

- I. Text Box
- II. Option/radio buttons
- III. Check boxes
- IV. Reset and Submit buttons

Subscribe to XYZ News Magazine and Emails

Interested in receiving daily small updates of all latest News? Well, now you can. And best of all, it is free! Just fill out this form and submit it by clicking the "send it in" button. We will put you on our mailing list and you will receive your first email in 3-5 days.

Please fill the following boxes to help us send the emails and our news letter

First Name:

Last Name:

Business:

We must have a correct e-mail address to send you the news letter:

Email:

How did you hear about XYZ News Magazine and Emails?

Here on the Web In a magazine Television Other

Would you like to be on our regular mailing list?

Yes, we love junk emails

Q.7 Create HTML documents (having multiple frames) in the following three formats:

Frame 1
Frame 2

Frame 1	
Frame 2	Frame 3

OR

SEC-2 : XML Programming

Theory: 20 Lectures

Credit: 2

Introduction: Understanding Mark-up Languages, Introduction to XML and its Goals. (4L)

XML Basics: XML Structure and Syntax, Document classes and Rules. (6L)

Other XML Concepts: Scripting XML, XML as Data, Linking with XML. (6L)

XML with Style: XSL –Style Sheet Basics, XSL basics, XSL style sheets. (4L)

Books Recommended

1. William J. Pardi , XML in action web technology, Microsoft Press, 1999
2. Michael J. Young ,Step by Step XML , Microsoft Press, 2002

Software Lab Based on XML:

Exercise #1 – Information Structure

In this exercise, student will practice identifying the structure of an information object. For the sample document provided below:

Label the information structures you see, including containing structures. 12. Draw a tree representation of the structure.



Exercise 2# Deconstructing an XML Document

In this exercise, student will practice identifying the explicit structure within an XML document.

In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below, create a document-like representation (or a simple drawing) for the content contained within the XML tags:

```
<book>
```

```
<coverInfo>
```

```
<title>The XML Handbook</title> <author>Charles F. Goldfarb</author> <author>Paul  
Prescod</author> <edition>Second</edition>
```

```
<description>The definitive XML resource: applications, products, and technologies. Revised  
and expanded—over 600 new pages.
```

```
</description>
```

```
</coverInfo>
```

```
</book>
```

Exercise #3 – Creating XML Markup

In this exercise, create some XML markup based on the tree representation from Exercise #1 above, and the content from the original sample document.

Exercise #4 – Well-Formedness

This exercise checks your understanding of the constraints for well-formedness. Are the following document instances well-formed? Explain any NO answers.

```
<list><title>The first list</title><item>An item</list> <item>An item</item><item>Another item</item>
```

```
<para>Bathing a cat is a <emph>relatively</emph> easy task as long as the cat is willing.</para>
```

```
<bibl><title>How to Bathe a Cat<author></title>Merlin Bauer<author></bibl>
```

Exercise #5-Well Formedness

This exercise is a bit more challenging than the previous example. Here is a fragment of an XML document instance. Identify all the places where it fails to match the constraints for well-formedness.

```
<PROCEDURE><TITLE>How to Bathe a Cat</TITLE> <OVERVIEW>
```

```
This procedure tells you how to bathe a cat. <WARNING></OVERVIEW>Cats don't like to take baths. You could get hurt doing this. Be sure to obtain all the required protective gear before you start. </WARNING><EQUIPEMENT><ITEM>Hockey Mask <ITEM>Padded Full-body Kevlar Armor</ITEM><ITEM>Tub full of warm water</ITEM><ITEM>Towels </ITEM><ITEM>First Aid kit</ITEM><ITEM>Cat Shampoo</ITEM>
```

```
<EQUIPEMENT><INSTRUCTIONS> <STEP> Locate the cat, who by now is hiding under the bed.</STEP><STEP>Place the cat in the tub of water.</STEP> <ITEM>Using the First Aid kit, repair the damage to your head and arms.</STEP> <STEP>Place the cat back in the tub and hold it down.</STEP> <STEP>Wash it really fast, then make an effort to dry it with the towels.</STEP> <STEP>Decide not to do this again. </STEP> </INSTRUCTIONS>
```

Note: Cover more exercises based on XML Programming theory concepts.

Semester – V

DSE-1A : Programming in Java

Theory: 60 Lectures

Credit: 4

Introduction to Java: Features of Java, JDK Environment (1L)

Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA (10L)

Java Programming Fundamental :Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping(for, while) ,Type Casting (10L)

Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes (10L)

Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods. (6L)

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages (8L)

Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions. (4L)

File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File (5L)

Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag (6L)

Books Recommended:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl Cgi , BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009
3. Herbert Schildt , Java 7, The Complete Reference, , 8th Edition, 2009.
4. E Balagurusamy , Programming with JAVA, TMH, 2007

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. Write a menu driven program for following:
 - a. Display a Fibonacci series
 - b. Compute Factorial of a number
 - c. WAP to check whether a given number is odd or even.
 - d. WAP to check whether a given string is palindrome or not.
4. WAP to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write java program for the following matrix operations:
 - a. Addition of two matrices
 - b. Summation of two matrices
 - c. Transpose of a matrix
 - d. Input the elements of matrices from user.
9. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of Multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
12. Write a java program to draw a line between two coordinates in a window.
13. Write a java program to display the following graphics in an applet window.
 - a. Rectangles
 - b. Circles
 - c. Ellipses
 - d. Arcs
 - e. Polygons
14. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage() prints the information about the error occurring causes.
15. Write a program for the following string operations:
 - a. Compare two strings
 - b. Concatenate two strings
 - c. Compute length of a string
16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

OR

DSE-1A : Software Engineering

Theory: 60 Lectures

Credit: 4

Software Process: Introduction ,S/W Engineering Paradigm , life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented) , System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy. (8L)

Software requirements: Functional and non-functional , user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document. Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary. (10L)

Design Concepts and Principles: Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system. (12L)

Software Configuration Management: The SCM process, Version control, Change control, Configuration audit, SCM standards. (8L)

Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling. (8L)

Testing: Taxonomy of software testing, levels, test activities, types of s/w test, black box testing testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging. (8L)

Trends in Software Engineering: Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools. (6L)

Books Recommended:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
4. James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
5. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.
6. Pfleeger, "Software Engineering", Pearson Education India, New Delhi, 1999. Carlo Ghezzi, Mehdi Jazayari and Dino Mandrioli, "Fundamentals of Software Engineering", Prentice Hall of India, New Delhi, 1991.

1. Practical Title

- Problem Statement,
- Process Model

2. Requirement Analysis

- Creating a Data Flow
- Data Dictionary,
- Use Cases

3. Project Management

- Computing FP
- Effort
- Schedule, Risk Table, Timeline chart

4. Design Engineering

- Architectural Design
- Data Design, Component Level Design

5. Testing

- Basis Path Testing

Sample Projects

- DTC Route Information: Online information about the bus routes and their frequency and fares
- Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
- Patient Appointment and Prescription Management System
- Organized Retail Shopping Management Software
- Parking Allocation System
- Wholesale Management System

SEC – 3: MySQL/ PL-SQL

(1+2 Lab)

Theory: 20 Lectures

Credit: 2

SQL Vs. SQL * Plus:

SQL Commands and Data types, Operators and Expressions,
Introduction to SQL * Plus.

(2L)

Managing Tables and Data:

- Creating and Altering Tables (Including constraints)
- Data Manipulation Command like Insert, update, delete
- SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL BETWEEN, EXISTS, LIKE
- Join, Built in functions

(6L)

Other Database Objects

- View
- Synonyms, Index

(4L)

Transaction Control Statements

- Commit, Rollback, Savepoint
- SQL v/s PL/SQL
- PL/SQL Block Structure
- Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.)
- % TYPE and % ROWTYPE
- Using Cursor (Implicit, Explicit)

(3L)

(5L)

Books Recommended:

1. Baron Schwartz , High Performance MySQL, O'Reilly, 2012.
2. Vikram Vaswani , The Complete Reference MySQL , McGraw Hill Educations, 2004.

Software Lab Based on MySQL (SQL/PL-SQL):

[SQL COMMANDS]

- 1) SQL* formatting commands
- 2) To create a table, alter and drop table.
- 3) To perform select, update, insert and delete operation in a table.
- 4) To make use of different clauses viz where, group by, having, order by, union and intersection,
- 5) To study different constraints.

[SQL FUNCTION]

- 6) To use oracle function viz aggregate, numeric, conversion, string function.
- 7) To understand use and working with joins.
- 8) To make use of transaction control statement viz rollback, commit and save point.
- 9) To make views of a table.
- 10) To make indexes of a table.

[PL/SQL]

- 11) To understand working with PL/SQL
- 12) To implement Cursor on a table.
- 13) To implement trigger on a table

OR

SEC – 3: Concepts of Software Testing

(1+2 Labs)

Theory: 20 Lectures

Credit: 2

Introduction

(5L)

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

Functional Testing\ Black-box Testing

(7L)

Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

Structural Testing\ White-box Testing

(8L)

Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage

Books Recommended:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mc Graw Hill Education.2009.
2. Yogesh Singh, Software Testing, Cambridge University Press,2011.

Computer Lab Based on Software Testing:

1. Write a program that take three inputs (a,b &c) that represent the sides of a triangle, and the output is one of the below four:
 - a. Not a triangle
 - b. Scalene triangle
 - c. Isosceles triangle
 - d. Equilateral triangle
 - 1.1 Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
 - 1.2 Generate test cases using Basis path testing.
 - 1.3 Run code coverage tool.
2. Write a program that determines the nature of roots of a quadratic equation. Output should be one of the following:-
 - Not a quadratic equation.
 - Complex roots
 - Real roots
 - Single roots
 - I. Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
 - II. Generate test cases using Basis path testing.
 - III. Run code coverage tool
3. Write a program that checks whether the number is even or odd. Run code coverage tool and find the amount of code being covered.
4. Write a program that dynamically allocates memory to10 integers using malloc() or calloc() and
 - donot free memory leading to memory leaks. Verify the same usingValgrind.
 - Now, free memory using free() at the end of the program to avoid memory leaks. Verify the same using Valgrind.
5. Use LoadUI load testing tool to test the web application performance.

Semester-VI

DSE-1B: Computer Networks

Theory: 60 Lectures

Credit: 4

Basic concepts : Components of data communication, standards and organizations, Network Classification, Network Topologies ; network protocol; layered network architecture;

Overview of OSI reference model; overview of TCP/IP protocol suite. (16L)

Physical Layer : Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway. (6L)

Data Link Layer : Framing techniques; Error Control; Flow Control Protocols; Shared media protocols - CSMA/CD and CSMA/CA. (8L)

Network Layer : Virtual Circuits and Datagram approach, IP addressing methods – Subnetting; Routing Algorithms (adaptive and non-adaptive) (8L)

Transport Layer: Transport services, Transport Layer protocol of TCP and UDP (6L)

Application Layer : Application layer protocols and services – Domain name system, HTTP, WWW, telnet, FTP, SMTP (10L)

Network Security : Common Terms, Firewalls, Virtual Private Networks (6L)

Books Recommended:

1. B.A. Forouzan: Data Communication and Networking, 4th Edition, Tata McGraw Hill, 2007.
2. D.E. Comer, Internetworking with TCP/IP, Vol. I, Prentice Hall of India, 1998.
3. W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2006.
4. D. Bertsekas, R. Gallager, Data Networks, 2nd edition, Prentice Hall of India, 1992.

Software Lab based on Computer Networks:

All programs should be developed in C/ C++ / Java

Implement the concepts of Computer Networks such as:

1. Simulate Checksum Algorithm.
2. Simulate CRC Algorithm
3. Simulate Stop & Wait Protocol.
4. Simulate Go-Back-N Protocol.
5. Simulate Selective Repeat Protocol.

OR

DSE-1B: Internet Technologies

Theory: 60 Lectures

Credit: 4

Introduction to Web Design: Introduction to hypertext markup language (html) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames. (6L)

Customized Features: Cascading style sheets, (css) for text formatting and other manipulations. (4L)

JavaScript: Data types, operators, functions, control structures, events and event handling. (8L)

Java: Use of Objects, Array and Array List class, Designing classes, Inheritance, Input/Output, Exception Handling. (12L)

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, Working with statements, Creating and Executing SQL Statements, Working with Result Set Objects. (10L)

JSP: Introduction to JavaServer Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values (20L)
Using an expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Database Access. (10L)

Books Recommended:

1. Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl Cgi By Ivan Bayross, BPB Publications, 2009.
2. BIG Java Cay Horstmann, Wiley Publication , 3rd Edition., 2009
3. Java 7 ,The Complete Reference, Herbert Schildt, 8th Edition, 2009.
4. The Complete Reference J2EE, TMH, Jim Keogh, 2002.
5. Java Server Pages, Hans Bergsten, Third Edition, O'Reilly Media December 2003.

Software Lab based on Internet Technologies

JAVA Script

1. Create a student registration form. Create functions to perform the following checks: a. Roll number is a 7-digit numeric value
b. Name should be an alphabetical value(String)
c. Non-empty fields like DOB
2. Implement a static password protection.
3. Write a java script a. To change the colour of text using SetTimeout()
b. To move an image across screen using SetInterval()

JAVA Programs

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. WAP to print the sum and product of digits of an Integer and reverse the Integer.
4. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
5. Write java program for the following matrix operations:

a. Addition of two matrices

b. Summation of two matrices

c. Transpose of a matrix

Input the elements of matrices from user

6. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.

JDBC

1. Create a table 'Student' and 'Teacher' in 'College' database and insert two rows in this newly created table using JDBC API and do the following: a. Update an already created table 'Teacher' in 'College' database by updating a teacher's name, with "Dr." appended before the name, whose name is "Rita".

b. Repeat the same thing for all the teachers using PreparedStatement.

c. Delete the student with ID=3 from 'Student' database.

d. Insert two students to the ResultSet returned by the query which selects all students with FirstName="Ayush". The database must also get updated along with ResultSet.

2. Create a procedure in MySQL to count the number of Rows in table 'Student'. Use Callable Statement to call this method from Java code.

JSP Practical list

1. Display the pattern:

1

1 2

1 2 3

Take 'n' in a textbox from user. Display this pattern using

- Scriptlets
- <c:forEach> loop

2. Make two files as follows:

a. main.html: shows 2 text boxes and 3 radio buttons with values "addition", "subtraction" and "multiplication"

b. operate.jsp: depending on what the user selects perform the corresponding function (Give two implementations: using request.getParameter() and using expression language)

3. Validate User input entered in a form. The input must include Name, DOB, Email ID, Lucky Number, Favorite food etc. (Refer Chapter 8)

4. Display Good Morning <uname>, Good Afternoon <uname> or Good Evening <uname> based on the current time of the day.

5. Create your custom library which contains two tags: <hello>, <choco>.

Usage of the tags:

- <hello name="Ajay">: Output should be Hello Ajay. It contains a mandatory attribute 'name' which can accept Dynamic value.

- <choco texture="Chewy">: Output should be FiveStar, BarOne.

<choco texture="Crunchy">: Output should be Munch. KitKat.

That means the mandatory attribute must accept a value, and based on the attributes value, it should give output. You must use a bean ChocoBean for this purpose.

SEC – 4 : PHP Programming

(1+2 Lab)

Theory: 20 Lectures

Credit: 2

Introduction to PHP:

(3L)

- PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.)
- PHP with other technologies, scope of PHP
- Basic Syntax, PHP variables and constants
- Types of data in PHP , Expressions, scopes of a variable (local, global)
- PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator.
- PHP operator Precedence and associativity

Handling HTML form with PHP:

(3L)

- Capturing Form Data
- GET and POST form methods
- Dealing with multi value fields
- Redirecting a form after submission

PHP conditional events and Loops:

(3L)

- PHP IF Else conditional statements (Nested IF and Else)
- Switch case, while ,For and Do While Loop
- Goto , Break ,Continue and exit

PHP Functions:

(3L)

- Function, Need of Function , declaration and calling of a function
- PHP Function with arguments, Default Arguments in Function
- Function argument with call by value, call by reference
- Scope of Function Global and Local

String Manipulation and Regular Expression:

(4L)

- Creating and accessing String , Searching & Replacing String
- Formatting, joining and splitting String , String Related Library functions
- Use and advantage of regular expression over inbuilt function
- Use of preg_match(), preg_replace(), preg_split() functions in regular expression

Array:

(4L)

- Anatomy of an Array ,Creating index based and Associative array ,Accessing array
- Looping with Index based array, with associative array using each() and foreach()
- Some useful Library function

Software Lab Based on PHP:

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string. Sample string : 'The quick " " brown fox'

Expected Output : Thequick""brownfox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.

13. Create a script to construct the following pattern, using nested for loop.

```
*  
* *  
* * *  
* * * *  
* * * * *
```

14. Write a simple PHP program to check that emails are valid.
15. WAP to print first n even numbers.
16. \$color = array('white', 'green', 'red')
Write a PHP script which will display the colors in the following way
: Output :
white, green, red,
• green
• red
• white
17. Using switch case and dropdown list display a “Hello” message depending on the language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.

Sample : 'the quick brown fox jumps over the lazy dog.'
Expected Result : That quick brown fox jumps over the lazy dog.

OR

SEC – 4 : Programming in Visual Basic

Theory: 20 Lectures

Credit: 2

GUI Environment: Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven), the GUI environment, compiling, debugging, and running the programs.

(2L)

Controls : Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.

(5L)

Operations: Data types, constants, named & intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data.

(3L)

Decision Making : If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box, testing whether input is valid or not.

(5L)

Forms Handling : Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms.

(2L)

Iteration Handling: Do/loops, for/next loops, using msgbox function, using string function.

(3L)

Book Recommended:

- a. Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh
(Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004))

Software Lab Based on Visual Basic:

1. Write a VB application to compute the sum of two variables.
2. Write a VB application to compute the factorial of a number n.
3. Write a VB application to compute the Fibonacci series of a number n.
4. Write a VB application to compute the series of prime numbers till number n.
5. Write a VB application to compute the maximum of three numbers.
6. Write a VB application to compute the sum of odd numbers and even numbers in an array of n integers.
7. Write a VB application to compare the strings.
8. Write a VB application to make a calculator.
9. Write a VB application to choose your hobbies from a list.
10. Write a VB application to illustrate the use of color radio button.
11. Write a VB application to illustrate the use of color scroll bar form.
12. Write a VB application to illustrate the use of color scroll bar label text.
13. Write a VB application to illustrate the use of color text box.
14. Write a VB application to show a timer.

K. Basu: Analytical Development Economics, OUP
Debesh Bhattacharya: Political Economy of Development
Pearce and Turner: Economics of Natural Resources and the Environment
Abhijit Banerjee, Roland Benabou and Dilip Mookerjee: Understanding Poverty, OUP, 2006
Todaro and Smith: Economic Development, Pearson Education, 2009

**SKILL ENHANCEMENT COURSE (SEC) IN SEMESTER- IV
SEC2**

Basic Computer Applications

Full Marks: 50

Credit: 2

Lectures: 15 + Practical: 15

It is a Lab Based Practical Paper. The student shall learn the operations through Lectures, Hands-on Practical Training followed by practical tests.

- 1. File Creation and Management System** (3 L + 2 P)
The File Tree; File Naming Conventions;
- 2. Word Processing** (2L + 3P)
Basic features of Text formatting; Creating documents; Heading Styles; Creating Reference Lists
- 3. Spread Sheet Solutions** (7L + 7P)
Basic features of Spreadsheets; Data entry, Mathematical Functions, Financial functions, Statistical Functions, Creating simple Line, Bar and Pie charts;
- 4. Presentations** (3L + 3P)
Creating Presentations; Pasting Charts etc in Presentations; Exporting Presentations as PDF

References:

Data Analysis Using Microsoft Excel – Ash Narayan Sah Excel Books India

Excel 2010 For Dummies Colin Banfield, John Walkenbach

Bhounik Sankar, Principles of Econometrics: A Modern Approach Using Eviews, OUP

OR

SEC 2

INDIAN STOCK MARKET TRADING

Full Marks: 50

Credit: 2

Lectures: 30

- 1. AN OVERVIEW OF SHARE MARKET** (Lectures:9)

Some Special Integrals: Beta and Gamma Functions and Relation between them. Expression of Integrals in terms of Gamma Functions. Error Function (Probability Integral). (4 Lectures)

Theory of Errors: Systematic and Random Errors. Propagation of Errors. Normal Law of Errors. Standard and Probable Error. Least-squares fit. Error on the slope and intercept of a fitted line. (6 Lectures)

Partial Differential Equations: Solutions to partial differential equations, using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Wave equation and its solution for vibrational modes of a stretched string, rectangular and circular membranes. Diffusion Equation. (14 Lectures)

Reference Books:

1. Mathematical Methods for Physicists: Arfken, Weber, 2005, Harris, Elsevier.
2. Fourier Analysis by M.R. Spiegel, 2004, Tata McGraw-Hill.
3. Mathematics for Physicists, Susan M. Lea, 2004, Thomson Brooks/Cole.
4. Differential Equations, George F. Simmons, 2006, Tata McGraw-Hill.
5. Partial Differential Equations for Scientists & Engineers, S.J. Farlow, 1993, Dover Pub.
6. Engineering Mathematics, S.Pal and S.C. Bhunia, 2015, Oxford University Press
7. Mathematical methods for Scientists & Engineers, D.A. McQuarrie, 2003, Viva Books

CC- V : MATHEMATICAL PHYSICS-II

Practical:

The aim of this Lab is to use the computational methods to solve physical problems. Course will consist of lectures (both theory and practical) in the Lab. Evaluation done not on the programming but on the basis of formulating the problem

Topics	Description with Applications
Introduction to Numerical computation software Scilab	Introduction to Scilab, Advantages and disadvantages, Scilab environment, Command window, Figure window, Edit window, Variables and arrays, Initialising variables in Scilab, Multidimensional arrays, Subarray, Special values, Displaying output data, data file, Scalar and array operations, Hierarchy of operations, Built in Scilab functions, Introduction to plotting, 2D and 3D plotting (2), Branching Statements and program design, Relational & logical operators, the while loop, for loop, details of loop operations, break & continue statements, nested loops, logical arrays and vectorization (2) User defined functions, Introduction to Scilab functions, Variable passing in Scilab, optional arguments, preserving data between calls to a function, Complex and Character data, string function, Multidimensional arrays (2) an introduction

Course Code: DSE-1

Course Title: Advanced Physical Chemistry (Prac)

2 Credits

List of Practical

Computer Programming based on numerical methods for:

1. Roots of equations: (e.g. volume of van der Waals gas and comparison with ideal gas, pH of a weak acid)
2. Numerical differentiation (e.g., change in pressure for small change in volume of a van der Waals gas, potentiometric titrations)
3. Numerical integration (e.g. entropy/ enthalpy change from heat capacity data), probability distributions (gas kinetic theory) and mean values
4. Matrix operations (Application of Gauss-Siedel method in colourimetry)

Reference Books

1. McQuarrie, D. A. Mathematics for Physical Chemistry University Science Books (2008).
2. Mortimer, R. Mathematics for Physical Chemistry. 3rd Ed. Elsevier (2005).
3. Yates, P. Chemical Calculations. 2nd Ed. CRC Press (2007).
4. Harris, D. C. Quantitative Chemical Analysis. 6th Ed., Freeman (2007) Chapters 3-5.
5. Noggle, J. H. Physical Chemistry on a Microcomputer. Little Brown & Co. (1985).