

Faculty of Computer Application & IT and Science

Study and Evaluation Scheme

Of

Master of Computer Application

[3 years & 2 Years(LE)]

M.C.A.

(Applicable w.e.f Academic Session 2016-19 till revised)



AKS UNIVERSITY, SATNA

Study and Evaluation Scheme

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AKS University, Satna
Department of Computer Application and IT
Semester wise Scheme for 2016 session for the course MCA and MCA(LE)
MCA 1st semester

S. NO.	PAPER CODE	SUBJECT/PAPER	#L	#T	#P	TOTAL CREDIT
		THEORY				
1	44CA101	Basic Application of Computers and office automation	3	1	0	4
2	44CA102	Programming in C Language	3	1	0	4
3	44CA103	Digital Electronics	3	1	0	4
4	44CA104	Advanced Operating System	3	1	0	4
5	44SS105-H/I	Spiritual Studies- HINDUISM/ ISLAM	3	0	0	3
		PRACTICAL				
1	44CA151	Basic Application of Computers LAB	0	0	3	2
2	44CA152	Programming in C Language LAB	0	0	3	2
		TOTAL CREDIT	15	5	6	23

MCA 2nd semester

S. NO.	PAPER CODE	SUBJECT/PAPER	#L	#T	#P	TOTAL CREDIT
		THEORY				
1	44CA201	Object Oriented Programming in C++	3	1	0	4
2	44CA202	Advanced Computer Network	3	1	0	4
3	44CA203	Computer Organization and Architecture	3	1	0	4
4	44CA204	Management Information System	3	1	0	4
5	44CA205	Cyber Security and Laws	3	1	0	4
		PRACTICAL				
1	44CA251	Object Oriented Programming in C++ LAB	0	0	3	2
2	44CA252	Advanced Computer Network LAB	0	0	3	2
		TOTAL CREDIT	15	5	6	24

MCA 3rd semester

S. NO.	PAPER CODE	SUBJECT/PAPER	#L	#T	#P	TOTAL CREDIT
		THEORY				
1	44CA308	JAVA Programming	3	1	0	4
2	44CA307	Computer Graphics	3	1	0	4
3	44CA303	Theory of Computation	3	1	0	4
4	44CA304	Data Structure Using C	3	1	0	4
5	44CA305	Advanced Software Engineering	3	1	0	4
6	44MS306	Discrete Mathematical Structure	3	1	0	4
		PRACTICAL				
1	44CA355	JAVA Programming LAB	0	0	3	2
2	44CA354	Project LAB	0	0	3	2
3	44CA353	Data Structure Using C LAB	0	0	3	2
		TOTAL CREDIT	18	6	9	30

MCA 4th semester

S. NO.	PAPER CODE	SUBJECT/PAPER	#L	#T	#P	TOTAL CREDIT
		THEORY				
1	44CA401	Analysis and Design of Algorithm	3	1	0	4
2	44CA402	Web Technology	3	1	0	4
3	44MS403	Applied Mathematics (Calculus & Statistics)	3	1	0	4
4	44CA404	Database Management System with Oracle	3	1	0	4
5		Elective-1	3	1	0	4
6	44CA406	Compiler Design	3	1	0	4
		PRACTICAL				
1	44CA451	Database Management System with Oracle LAB	0	0	3	2
2	44CA452	Web Technology LAB	0	0	3	2
3	44CA453	Project LAB	0	0	3	2
		TOTAL CREDIT	18	6	9	30

Elective 1: (Choose any one of these)

- | | |
|--------------------------------------|------------------|
| a. Artificial Intelligence | 44CA405-A |
| b. Cryptography and Network Security | 44CA405-B |
| c. Entrepreneurship | 44EN405-C |
| d. Fuzzy logic and Neural Network | 44CA405-D |
| e. Digital Image Processing | 44CA405-E |

MCA 5th semester

S. NO.	PAPER CODE	SUBJECT/PAPER	#L	#T	#P	TOTAL CREDIT
		THEORY				
1	44CA506	Operational Research	3	1	0	4
2	44CA502	Data Warehousing and Data Mining	3	1	0	4
3	44CA503	Linux and shell programming	3	1	0	4
4	44CA507	Python Programming	3	1	0	4
5		Elective-2	3	1	0	4
6	44CA508	Cloud Computing	3	1	0	4
		PRACTICAL				
1	44CA551	Linux and shell programming LAB	0	0	2	1
2	44CA555	Python Programming LAB	0	0	2	1
3	44CA553-A/B/C/D/E	Elective-2 LAB	0	0	3	2
4	44CA554	Minor Project LAB	0	0	3	2
		TOTAL CREDIT	18	6	10	30

Elective 2: (Choose any one of these)

- | | |
|-----------------------------------|------------------|
| a. Advance Java Programming | 44CA505-A |
| b. ASP.NET with C# | 44CA505-B |
| c. Android Programming | 44CA505-C |
| d. System and Network Programming | 44CA505-D |
| e. MATLAB programming | 44CA506-E |

MCA 6th semester

S. NO.	PAPER CODE	SUBJECT/PAPER	#L	#T	#P	TOTAL CREDIT
		PRACTICAL				
1	44CA651	Major Project LAB	0	0	12	
2	44CA652	Seminar and presentation	0	0	2	
		TOTAL CREDIT	0	0	14	14

MCA
Semester-I
BASIC APPLICATION OF COMPUTERS AND OFFICE AUTOMATION

Unit I : Introduction to Computers

Introduction, Characteristics of Computers, Block diagram of computer, Types of computers and Features: Mini Computers, Micro Computers, Mainframe Computers, Super Computers, Generation of computers
Types of Programming Languages: Machine Languages, Assembly Languages, High Level Languages.
Memory: Types of Memory (Primary and Secondary): RAM, ROM, PROM, EPROM, EEPROM, Secondary S

Unit II : Operating System and Services in O.S.

DOS – Overview , Windows Operating Environment

Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons; Windows Accessories: Notepad, Paintbrush.

Unit III

Computer Viruses, Types of Viruses, Ways to catch Computer Virus, virus detections and preventions, Worms. Security in IT- Attacks, hackers, crackers, cryptology, encryption and decryption , firewall etc.

Unit IV

Introduction to E-Supply Chain Management., E-Supply-Chain components, E-Supply-Chain architecture, Major Trends in E-SCM, Some examples of using ESCM. E-Customer Relationship Management (E-CRM) Customer Relationship management concepts, How technology can help with this. E-CRM solutions, advantages, E-CRM capabilities, Data Mining & E-CRM, Some examples of using E-CRM.

UNIT V

MS Word 2007: – Word basics, formatting text and documents, working with headers, footers and footnotes, tabs, tables and sorting. Working with graphics, templates, wizards and sample documents, introduction to mail merge and macros.

MS Power Point 2007: - PowerPoint basics, creating presentation the easy way, working with graphics. Inserting various objects (Picture, Organizational Chart, Audio, Video etc.) in the slide .Adding Animation effects in the slide.

MS Excel 2007: - Excel basics, rearranging worksheets, excel formatting tips and techniques. Introduction to functions, Excel chart features, working with graphics. Using worksheet as a Database.

Text Books

1. Fundamental of Computers – By V. Rajaraman B.P.B. Publications

Reference book

1. Fundamental of Computers – By P. K. Sinha

BASIC APPLICATION OF COMPUTERS AND OFFICE AUTOMATION LAB

Practical exercises based on MS Office/ Open Office tools using document preparation and spreadsheet handling packages.

MS Word

1. 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.
2. 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.
3. 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.
 4. BPB Publications plans to release a new book designed as per your syllabus. Design the **firstpage of the book** as per the given specifications.
 - ☐ The title of the book should appear in bold using 20-point Arial font.
 - ☐ The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - ☐ At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - ☐ The details of the offices of the publisher (only location) should appear in the footer.
 5. 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.
 - c. Design a Garage Sale sign.
 - d. Make a sign outlining your rules for your bedroom at home, using a numbered list.
 6. Create the following documents:
 - (a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
 - (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.
 7. 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

9. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	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:
In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

10. Wrapping of text around the image.

11. Following features of menu option must be covered

FILE	Complete menu
EDIT	Complete menu
VIEW	Complete menu
INSERT	Complete menu
FORMAT	Complete menu
TABLE	Complete menu
WINDOW	Complete menu
HELP	Complete menu
TOOLS	All options except Online collaboration, Tools on Macro, Templates

MS Excel

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION

State	Qtr1	Qtr2	Qtr3	QTR4	Qtr Total	Rate	Amount
Delhi	2020	2400	2100	3000		15	
Punjab	1100	1300	1500	1400		20	
U.P.	3000	3200	2600	2800		17	
Harayana	1800	2000	2200	2700		15	
Rajasthan	2100	2000	1800	2200		20	

**TOTAL
AVERAGE**

(a) Apply Formatting as follow:

- i. Title in TIMES NEW ROMAN
- ii. Font Size - 14
- iii. Remaining text - ARIAL, Font Size -10
- iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.
- v. Numbers in two decimal places.
- vi. Qtr. Heading in center Alignment.
- vii. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	HarBhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
≥ 80	A+
$\geq 60 < 80$	A
$\geq 50 < 60$	B
< 50	F

3. Given the following worksheet

	A	B	C	D	E	F	G	
1	Salesman	Sales in (Rs.)						
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission	
3	S001	5000	8500	12000	9000			
4	S002	7000	4000	7500	11000			
5	S003	4000	9000	6500	8200			
6	S004	5500	6900	4500	10500			
7	S005	7400	8500	9200	8300			
8	S006	5300	7600	9800	6100			

Calculate the commission earned by the salesmen on the basis of following Candidates:

If total Sales	Commission
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
>= 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

Allowances

- HRA Dependent on Basic
 - 30% of Basic if Basic <=1000
 - 25% of Basic if Basic >1000 & Basic <=3000
 - 20% of Basic if Basic >3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is <=1000Rs. 75/- if Basic >1000 & Basic <=2000
Rs. 100 if Basic >2000
- Entertainment Allowance NIL if Basic is <=1000Rs. 100/- if Basic > 1000

Deductions

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500
Rs. 60/- if Basic > 1500 & Basic <=3000
Rs. 80/- if Basic >3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

No. of Instalments	5%	6%	7%	8%	9%
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX
5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest	8%
Time	5 Years
Principal	Simple Interest
1000	?
18000	?
5200	?

7. The following table gives 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

- (a) Calculate total sale year wise.
 (b) Calculate the net sale made by each salesman
 (c) Calculate the maximum sale made by the salesman
 (d) Calculate the commission for each salesman under the condition.
 (i) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
 (ii) Otherwise give 2% commission.
 (e) Draw a bar graph representing the sale made by each salesman.
 (f) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income (Net): 1,475

EXPENSES	JAN	FEB	MARCH	QUARTER TOTAL	QUARTER AVERAGE
Rent	600.00	600.00			
Telephone	48.25	43.50	60.00		
Utilities	67.27	110.00	70.00		
Credit Card	200.00	110.00	70.00		
Oil	100.00	150.00	90.00		
AV to Insurance	150.00				
Cable TV	40.75	40.75	40.75		

Monthly Total

- (a) Calculate Quarter total and Quarter average.
 (b) Calculate Monthly total.
 (c) Surplus = Monthly income - Monthly total.
 (d) What would be total surplus if monthly income is 1500.
 (e) How much does telephone expense for March differ from quarter average.
 (f) Create a 3D column graph for telephone and utilities.
 (g) Create a pie chart for monthly expenses.

9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name	1997	1998	1999	2000	total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	

B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs. 600.00
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00
E	Rs. 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs. 560.00

(a) Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.

(b) Chart Title should be '_Total Revenue of sam's Bookstall (1997-2000)'

(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

MCA
Semester-I
PROGRAMMING IN C LANGUAGE

Unit I

C-basic: C character set, Identifiers and keyword data types, constants, variables and arrays, declarations, expression statements, symbolic constants, compound statements, assignment operation, conditional operators, bit operators.

C-Constructs : - If statement, if-else statement, Nested if statement, While statement, do..... while, for statement, switch statement, else-if ladder, noted control statement, break operator, continue operator, comma operator, GOTO statement.

Unit II

C-Functions: - Function declaration, definition & scope, recursion, call by value, call by reference.

Arrays : - Arrays, declaring arrays, initializing array, 1 Dimensional array, 2 Dimensional array, multi-dimensional array.

Storage class : - Automatic external (global) static & registers.

Structure & Union – Introduction of structure, union array within structure, structure passing to functions, into of union.

Unit III

Pointers – Introduction to pointers features of pointers, utilizing a pointer, declaring a pointer, scale factor, chain of pointer, pointer expression, pointer to an array, an array of pointers, pointers to functions, an array of pointer to function. Pointer to structure, pointer within the structure.

DMA – Introduction to Dynamic memory allocation, calloc (), malloc (), realloc (), free (), alloc. h

Unit IV

String manipulation

String, pointer to string, 2D array of characters, an array of pointers of strings, limitation of array of pointers to string, NULL pointer, accessing string without pointers, accessing strings using pointers, string manipulation without string functions, palindrome of string, header files of string and characters.

File handling – Introduction to file handling, text vs Binary file. Various files handling functions getc (), putc (), getc (), fprintf (), fscanf (), fgets (), fputs (), fread (), fwrite (), Random access file, fseek (), ftell () and rewind ().

Unit V

Preprocessor – Macro substitution, file inclusion conditional compilation preprocessor, directive, miscellaneous directives.

Graphics programming – initrgraph (), Drawing objects in graphics – line, rectangles, ellipse, circle, polygon, filling colors, text formatting functions.

Text Books

1. Yashavant Kanetkar, “Let Us C” – Seventh Edition, BPB Publications, 2007

Reference Book

1. Kernighan, Ritchie, “The C Programming Language”, Prentice Hall of India

List of C practical:

1. Write a C program to display Your Name, Address and City in different lines.
2. Write a C program to find the area of a circle using the formula. Area = PI * r²
3. Write a C program to find the maximum from given three nos.
4. Write a C program to find that the accepted no is Negative, Positive or Zero.
5. Write a C program to convert centigrade into Fahrenheit. Formula: C= (F-32)/1.8.
6. Write a C program to find the sum of digits of accepted no.
7. Write a C program to find the sum of first 100 odd nos. and even nos.

8. Write a C program to display first 25 Fibonacci nos.
9. Write a C program to find factorial of accepted nos.
10. Write a C program to print the accepted no and its reverse no.
11. Write a C program to find whether the accepted string number is palindrome or not.
12. Write a C program to find $x_1+x_2+x_3+x_4+ \dots+x_n$.
13. Write a C program to convert decimal to binary.
14. Write a C program to arrange the accepted numbers in ascending order and descending order.
15. Convert given line into upper case or lower case character as user want. Use switch statement for the choice of case.
16. Check accepted integer is prime number or no.
17. Convert accepted integer into word. For Example 55 = fifty five.
18. Convert accepted DATE into word. For Example 12/12/1972 = 12th December 1972.
19. Find the frequency of entered different integer nos.
20. Accept two different arrays, merge it and make it sort in ascending order.
21. Print 3 students detail of R-no, name, address, city, phone on screen. Use structure.
22. Find the NPR, NCR with using User Defined Function. $NPR = N! / (N-R)!$ $NCR = N! / (R!(N-R)!$
23. Swap the values of two different numbers using UDF.
24. Display this kind of output on screen.

```

C
CP
CRR
..
CPROGRAMING
.
.
CPR
CP
C

```

25. Display this kind of output on screen.

```

1
01
101
0101

```

26. Display this kind of output on screen.

```

1
01
101

```

27. Display this kind of output on screen.

```

1
23
456
78910

```

...

```

90 91

```

.....

28. Display this kind of output on screen.

```

*
**
***
****

```

29. Display this kind of output on screen.

```

1
121
12321
1234321
123454321

```

30. Write a program to work as a dos type command using command line argument.
31. Program to show swap of two no's without using third variable.
32. Program to show the use of conditional operator.
33. Program to find that entered year is leap year or not.
34. Program to find whether given no is even or odd.
35. Program to shift inputted data by two bits to the left.
36. Program to use switch statement, Display Monday to Sunday.
37. Program to display arithmetic operator using switch case.
38. Program to show swap of two no's without using third variable.
39. Program to show table of a number using functions.
40. Program to show call by value.

MCA
Semester-I
DIGITAL ELECTRONICS

Unit I

Number systems and Arithmetic Different number systems and their inter conversions. Binary arithmetic : Binary addition, subtraction, multiplication and division. Hexadecimal arithmetic : Addition, subtraction, multiplication and division. Binary subtraction using 1's complement, 2's complement method, overflow, underflow, codes, fixed point representation, floating point representation.

Unit II

Boolean algebra and logic gates postulates of Boolean algebra theorems of Boolean algebra : Complementation, commutative, AND, OR. Associative, Distributive, Absorption laws, DeMorgan's theorems. Reducing Boolean expressions. Logic gates: AND, OR, NOT, Ex-OR, EX-NOR NAND and NOR as Universal gates.

Unit III

Minimization techniques Introduction to SOP and POS minterms, midterms, K-map, Kmap for 2,3,4,5variables, don't care condition. Combinational and Arithmetic logic Circuits Half Adder and full Adder Binary Parallel Adder Half Subtract or, full subtract or Multiplexer and Demultiplexer.

Unit IV

Flip Flops Introduction: RS FF Clocked RS FF, DFF Triggering preset and clear JK FF, TFF, Race around condition Master Slave FF

UNIT V

Counters Introduction: Asynchronous / Ripple Counter Modules counter, MOD-12 counter, Synchronous counter : Synchronous serial and synch. Parallel counter BCD counter Ring counter Johnson counter Shift registers – Introduction, buffer register serial in serial out, serial in parallel out parallel in serial out, parallel in parallel out.

Text Books:

1. M. Morris Mano, Digital Design, 5th edition,

Reference book

1. R. P. Jain, Digital Electronics
2. R.K Gaur, Digital Electronics and microprocessor

MCA
Semester-I
ADVANCED OPERATING SYSTEM

Unit I

Introduction-What is Operating system? System calls, Operating system architecture, Operating System service. Simple batch Systems, multiprogrammed batches Systems, Time sharing systems, Personal computer systems, parallel systems, distributed Systems, Realtime Systems, multitasking, RTOS .

Unit II

Process-Process concept, Process Scheduling, operation on processes, PCB, Cooperating processes, Interprocess Communication.

Thread-Concept of thread, multithreading, context switching, Scheduling criteria, Types of Scheduling, long term , short term and medium term Scheduling. Scheduling algorithms. Multiple processor scheduling

Unit III

Process Synchronization-Critical section problem, Synchronization hardware, Semaphores.

Deadlock-Definition, deadlock characterization, handling of deadlock, deadlock prevention, avoidance, detection and recovery.

Unit IV

Memory Management-Logical Vs. Physical Address Space, Swapping, contiguous allocation, Paging, Segmentation, Virtual Memory, demand Paging, Performance of demand paging, page replacement, Page replacement algorithm, thrashing.

Secondary storage Structure-Disk structure, disk Scheduling, disk management, swap space management, disk reliability.

UNIT V

File System-Directory structure, access control verification, logical file system, physical file system. File space allocation, free space management, File locking, file protection and distributed file systems.

Advanced topics in operating system: - Real time operating system, distributed operating system, comparison among sun solaris, Apple, Mac OS, Windows, Linux systems.

Text Books

1. Galvin, Operating system concepts, Wiley Publications

MCA
Semester-I

SPIRITUAL STUDIES (ISLAMISM)

Unit - I

Six century mein arab ki rajnaitil ,dharmik and qabilai system Mohd (SAW) ka jivan parichay Mohd (SAW) ki sikhaye Mohd ka hizarat karna Islam dharm ka prambh Islam dharm ki sikhaye

Unit - II

Tauheed Kalma (imane mojammal, imane mofassal) Namaz and roza Zakat and haj Wazu and azaan

Unit - III

Tauret , zubur , injeel and quran ka parichay ,“Wahee “ ki paribhasa . zibreel ameen and wahi ka sambandh ,Quran ka dharti par utarna ,Quran ka mahatva antim kitab ke roop me,Sureh aur aayet ki vyakhya . quran ki pramukh sureh,Quran or hafiza

Unit - IV

Hadees aur sunnat ka parichay . hadees or sunnat ka mahatva hamare jivan me ,Mohd (SAW) aur hadees. pramukh hadees or sunnat ka mahatva or upyogita hamari zindagi me,Sokar uthane ki sunnatien or sone ki sunnatien . khane or peene ki sunnatein . Libas ki sunnatein , bimari or aayadat ki sunnatein ,

Unit - V

Malayaika or farishte , Alaah ke messenger . alaah ke rasul Navi or rasul ki visheshtaye . navi or rasul me antar Pramukh naviyon or rasulo ki study Hazrat adam (A. S), hazrat musa (A.S) Hazrat yusuf (A.S), hazrat esa Hazrat Ibrahim, hazrat ismaeel , Antim navi mohd (SAW) ,Sahaba and khalifa, Sahaba aur khalifa me antar , Mojeza or karamaat , Important mozaze ,Ebadat ,Kufr and shirk , Mata pita , relatives and neighbour ke adhikar . islam me aurat or mard ke adhikar ,Islam me sabr aur shukr . islam me ghibat ,chughli and blaim ,Islam me sammanta

SUBJECT NAME: SPIRITUAL STUDIES (HINDUISM)

UNIT- I	
अध्याय – प्रथम (अर्जुनविषाद योग)	
अर्जुन की मोहग्रस्तता	श्लोक सं.- 1, 2, 15-18, 32-35
अध्याय – द्वितीय (सांख्य योग)	
अर्जुन का नैराश्य	श्लोक सं.- 2, 3
शरीर और आत्मा का विश्लेषण	श्लोक सं.- 11-30
कर्तव्यपालन	श्लोक सं.- 31-38
निष्काम कर्मयोग, स्थितप्रज्ञ एवं तापत्रय	श्लोक सं.- 47-72
अध्याय – तृतीय (कर्मयोग)	
कर्मयोग	श्लोक सं.- 3-15, 19-21, 27, 30, 31, 34, 35
षटविकार	श्लोक सं.- 36-43
UNIT - II	
अध्याय – चतुर्थ (ज्ञानकर्मसंन्यास योग)	
गीता का इतिहास, भगवान के प्राकट्य का कारण एवं उनकी सर्वज्ञता	श्लोक सं.- 3-20
अध्याय – पंचम् (कर्मसंन्यास योग)	
ईश्वरभावनाभावित कर्म	श्लोक सं.- 1-20
अध्याय – षष्ठ (आत्मसंयम योग)	
ध्यान योग या सांख्य योग	श्लोक सं.- 1-4, 6-14
सिद्धि या समाधि योग	श्लोक सं.- 20-24, 30
UNIT- III	
अध्याय - सप्तम् (ज्ञानविज्ञान योग)	
परा और अपरा शक्ति	श्लोक सं.- 4-14
पुण्यात्मा मनुष्य के लक्षण	श्लोक सं.- 16-18, 21, 30
अध्याय - अष्टम् (अक्षरब्रह्म योग)	
ब्रह्म, आत्मा, अधिभूत, अधिदैव, अधियज्ञ	श्लोक सं.- 2-11
मुक्तिलाभ की विधि	श्लोक सं.- 12-16, 24, 25, 26
अध्याय - नवम् (राजविद्यागुह्य ज्ञान)	
परमगुह्यज्ञान	श्लोक सं.- 15-22, 24-30, 34
UNIT - IV	
अध्याय - दशम् (विभूति योग)	
श्रीभगवान का ऐश्वर्य	श्लोक सं.- 4, 5, 20-39
अध्याय - एकादश (विश्वरूपदर्शन योग)	
श्रीभगवान का विराट स्वरूप	श्लोक सं.- 11-30
अध्याय - द्वादश (भक्तियोग)	
भक्तियोग का वर्णन	श्लोक सं.- 2, 6-12
अव्यक्त की उपासना में क्लेश	श्लोक सं.- 3, 4, 5
शुद्ध भक्त के लक्षण	श्लोक सं.- 13-20

UNIT - V अध्याय - त्रयोदश (प्रकृति, पुरुष और चेतना)	
क्षेत्र, क्षेत्रज्ञ एवं कर्मक्षेत्र की परिभाषा ज्ञान, ज्ञेय प्रकृति एवं परमात्मा चेतना	श्लोक सं.- 2-7 श्लोक सं.- 8-12, 13-18 श्लोक सं.- 21-23 श्लोक सं.- 34
अध्याय - चतुर्दश (गुणत्रयविभाग योग)	
त्रिगुण स्वरूप	श्लोक सं.- 5-18
अध्याय – पञ्चदश (पुरुषोत्तम योग)	
परम पुरुष का स्वरूप जीव का स्वरूप	श्लोक सं.- 12-15, 17-19 श्लोक सं.- 16
UNIT - VI अध्याय – षोडश (दैवासुरसम्पद्विभाग योग)	
दैवीय स्वभाव आसुरी स्वभाव	श्लोक सं.- 1-3 श्लोक सं.- 4,7,8, 11-15, 21-23

अध्याय – सप्तदश (श्रद्धात्रयविभाग योग)

श्रद्धा के तीन प्रकार भोजन के प्रकार यज्ञ के प्रकार तप के प्रकार दान के प्रकार ॐ कार का प्रतिपादन सत्, असत् का प्रतिपादन	श्लोक सं.- 2, 4-6 श्लोक सं.- 8-10 श्लोक सं.- 11-13 श्लोक सं.- 13-19 श्लोक सं.- 20-22 श्लोक सं.- 23, 24 श्लोक सं.- 26-28
अध्याय – अष्टादश (मोक्षसंन्यास योग)	
संन्यास एवं त्याग में अंतर त्याग के प्रकार कर्म के कारण कर्म के प्रेरक तत्व कर्म के प्रकार कर्ता के प्रकार चार वर्णों के स्वाभाविक गुण प्रभु के प्रति समर्पण भाव	श्लोक सं.- 2 श्लोक सं.- 4, 7-9,11 श्लोक सं.- 14,15 श्लोक सं.- 18-22 श्लोक सं.- 23-25 श्लोक सं.- 26-28 श्लोक सं.- 42-44,47 श्लोक सं.- 65,66

Recommended books (संदर्भ ग्रंथ सूची)

1. श्रीमद्भगवद्गीता – गीताप्रेस, गोरखपुर ।
2. श्रीमद्भगवद्गीता – मधुसूदनसरस्वती, चौखम्भा संस्कृत संस्थान, वाराणसी, 1994 ।
3. श्रीमद्भगवद्गीता – एस. राधाकृष्णन् कृत व्याख्या का हिन्दी अनुवाद, राजपाल एण्ड सन्स, दिल्ली, 1969।
4. श्रीमद्भगवद्गीता – श्रीमद् भक्तिवेदांत स्वामी प्रभुपाद, भक्तिवेदांत बुक ट्रस्ट, मुंबई, 1996 ।
5. Srimadbhagawadgita – English commentary by Jaydayal Goyandaka, Gita Press, Gorakhpur, 1997.

MCA
Semester-II
COMPUTER ORGANIZATION AND ARCHITECTURE

Unit - 1

Introduction:

Computer Organization, Architecture and Design, Von-Neumann model, Computer Registers, Computer System Bus, Register Transfer Language, Micro operations, Memory transfer, Bus transfer, Flynn's classification, Register Organization.

Additional Reading/Working Topics/Indicative lists: Experiments on different logic gates and flip-flop.

Unit - 2

Basic Computer organization:

Instruction, types of instruction, instruction cycle, instruction format, PSW, ALU, subroutine, interrupt, interrupt cycle, control memory, design of control unit, types of control unit, RISC, CISC, addressing modes.

Additional Reading/Working Topics/Indicative lists: Execution cycle/CPU cycle numerical

Unit - 3

I/O organization:

I/O ports, I/O interface, Isolated I/O and memory mapped I/O, I/O data transfer, PIO, , I/O interfacing chips, I/O controller, I/O characteristics, DMA, modes of transfer, strobe and handshaking, peripheral devices, Daisy chaining, IOP.

Additional Reading/Working Topics/Indicative lists: study of integrated chips useful in I/O system.

Unit - 4

Memory Organization:

Memory Hierarchy, main memory, types of ROM and RAM, auxiliary memory, associative memory, cache memory, virtual memory, memory mapping, replacement algorithm, principle of locality of reference, flash memory, BIOS.

Additional Reading/Working Topics/Indicative lists: memory organization of flash memory devices and micro SD memory cards

Unit - 5

Processor organization:

Parallel processing, types of parallel processing, pipelining, types of pipelining, Amdahl's law, speedup computation, history of computer processors, 8086, block diagram of 8086, flag register of 8086, overview of Pentium processor, differences among 8086, 80186, 80286, 80386, 80486, and Pentium.

Text books:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization", McGraw-Hill, 2002.
2. M. Morris Mano, Computer System Architecture, 3rd edition,

References:

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.
2. David A.Patterson and John L.Hennessy, "Computer Organization and Design: The hardware / software interface", 2nd Edition, Morgan Kaufmann, 2002
3. John P.Hayes, "Computer Architecture and Organization" 3rd Edition, McGraw Hill,

MCA
Semester-II
CYBER SECURITY AND LAWS

Unit-1

Security principles, threats and attack techniques: Cyber Security, Cyber Security policy, Information security, Security triad: Confidential, Integrity, Availability, Security threats and attacks, threats security, Weak / Strong Passwords and Password Cracking, Insecure Network connections, Malicious Code, Programming Bugs, Different Viruses and worms.

Unit2

Authentication and access control: Identification, Authentication, Authentication by passwords, Access control structures, Types of access control.

Cryptography and Network security: Cryptographic mechanisms, Digital signatures, Encryption, digital signature certification, suspension and revocation of digital signature certificate, Protocol design principles, Firewalls, Intrusion detection, Active/ Passive- Interference,Interception,Impersonation ,Worms .

Unit-3

Protection measures: Business risk analysis, Prevention, detection and response , Security Policies, Security Procedures and Guidelines , Business Continuity and Disaster Recovery.

Legal and Ethical Issues: Protection of data and Information Laws, Employees rights, Software failure, Computer Crime, Privacy, and Ethics

Unit-4

Cyber crime and IT Act: Cyber Governance Issues, Cyber User Issues, Cyber Crime and Offences, Overview of IT Act, 2000, Amendments and Limitations of IT Act, Electronic Governance, Legal Recognition of Electronic Records, Cyber Crime and Offences, Concept of domain names, new concept in trademark and dispute, cyber squatting, reverse hijacking, spamming.

Unit-5

Hacking: Introduction of hacking, hacking, criminal hacking vs. Ethical hacking.

IPR: Ethical Issues in intellectual property right, copy right and related rights, patent and related rights, Trade Marks and rights arising from Trademark registration, software piracy, plagiarism. Indian Legislations for the protection of various types of Intellectual Properties

Advance topic: Database, web and Mobile Security, Authentication in distributed systems

Text Books:

1. Cyber laws and syber security in developing and emerging economies, Zeinab Karake-Shalhoub, Luna Al Qasimi
2. Computer Security, Dictor gouman, John Wiley & Sons

Reference Books

1. Computer Security: Art and Science, Mathew Bishop, Addison-Wisley
Computer Security, 2nd ed. Author: Dieter Gollmann Publisher: John Wiley & Sons, 2006 ISBN: 0-470-86293-9

MCA
Semester-II
MANAGEMENT INFORMATION SYSTEM

Unit - 1

Management Information Systems - Need, Purpose and Objectives -Contemporary Approaches to MIS - Information as a strategic resource - Use of information for competitive advantage - MIS as an instrument for the organizational change Information, Management and Decision Making - Models of Decision Making -Classical, Administrative and Herbert Simon's Models - Attributes of information and its relevance to Decision Making - Types of information

Unit - 2

Information Technology - Definition, IT Capabilities and their organizational impact -Telecommunication and Networks - Types and Topologies of Networks -IT enabled services such as Call Centers, Geographical Information Systems etc. FIS, Mis, HRIC, HRA

Unit - 3

Systems Analysis and Design - Systems Development Life Cycle – Alternative System Building Approaches - Prototyping - Rapid Development Tools – CASE Tools – Object Oriented Systems (Only introduction to these tools & techniques)

Unit - 4

Decision Support Systems - Group Decision Support Systems – Executive Information Systems - Executive Support Systems - Expert Systems and Knowledge Based Expert Systems - Artificial Intelligence

Unit - 5

Management Issues in MIS - Information Security and Control – Quality Assurance -Ethical and Social Dimensions, Corporate Social Responsibility, - Intellectual Property Rights as related to IT Services / IT Products - Managing Global Information Systems.

Text Books:

1. Management information system, Pearson Publication

Reference book

1. Management information system, TMH publications

MCA
Semester-II
OBJECT ORIENTED PROGRAMMING IN C++

Unit - 1

OOPS-Evolution of programming methodologies, origin of c++,procedural Approach Vs. Object oriented approach, Principles or concepts of OOPs. Merits and demerits of OOPs. Comparison of C and C++-Limitations of c, Introduction to C++, Structure of C++ Program. Added features of C++ over C-Storage classes, reference variables, inline functions, cin, cout. Scope resolution operator, member dereferencing operator. Default arguments.

Unit - 2

Introduction to Objects and classes-Defining the class, defining data members and member functions, creating objects, access specifiers-private, public, protected. Nested classes, local classes, empty class. Friend function and friend class. Passing objects as function arguments, returning objects from functions, static members, this pointer, comparison of class with structure. Memory management-new and delete operator, pointer to object, pointer to class members, wild pointers, dangling pointers, smart pointers.

Unit - 3

Constructors and destructors-Purpose of constructors and destructors,default constructors, constructors with and without parameters, Constructor overloading, copy constructor, deep and shallow copy. Invoking constructor and destructor, dynamic constructors, constructors and destructors with static members. Overloading Concepts-Function Overloading, Unary and binary operator overloading, overloading new and delete operators, overloading special operators.

Unit - 4

Inheritance-Basic concepts ,Reusability and Extensibility, Types of Inheritance, private ,public and protected Inheritance. Virtual base class. Virtual destructor. Overriding member functions, order of execution of constructors and destructors. Polymorphism-Method polymorphism, polymorphism by parameter, parametric polymorphism, early and late binding. Exceptions-Exceptions,Inheritance and Exceptions,Exception Hierarchies,Inside an Exception Handler, defining your own exceptions

Unit - 5

Templates-Generic functions, Generic classes, Template restrictions. Streams and manipulators. Unformatted I/O functions. Creating insertors and Extractors. Files-Opening, reading, writing, appending and closing files.

Text books:

1. Object Oriented Programming in C++ , Robert Lafore

Reference books:

1. Object Oriented Programming using C++, E.Balaguruswamy

C++ Project-

- Moving ball screen saver
- The Classic Game of Snake & Ladder
- Data structure (stack Implementation)
- Banking Record System
- Railway seat reservation question which comes in sapient
- GK Quiz

List of Practical:

1. Write a C++ program that will ask for a temperature in Fahrenheit and display it in Celsius using a class called temp and member functions.
2. Create a class Distance, which accepts data in feet and inches, adds two distances and displays the members of the distance object in the appropriate form. Test the class in the main program by creating object d1 and d2 of type distance, accept data for each object and add them then display them.

3. An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot papers. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case, a number read is outside the range 1 to 5, that ballot should be considered as a 'spoilt ballot', and the program should also count the number of spoilt ballots.

4. A Cricket team has the table of batting figures for a series of test matches. Write a program to read the data name, runs, innings, times not out into a class object and calculate the batting average, also display the result in the format as given below:

Player's name	Runs	Innings	Times Not Out	Batting Avg
Tendulkar	632	15	0	
Azharuddin	524	16	2	

5. Write a program to implement the push and pop functions of a stack using a class Stack. Also make use of a private member function display() to display contents of the stack after every push and pop operations. Create a member function init() to initialize top of the stack.

6. Define a class to represent Bank account. Include the following members. Data members

- (1) Name of depositor
- (2) Account number
- (3) Type of account
- (4) Balance member functions
 - (a) To assign initial values
 - (b) To deposit an amount in a particular account
 - (c) To withdraw an amount after checking the balance
 - (d) To display name and balance

Write a main program to test the class for handling 10 customers

7. Write a program that calculates the value of m raised to the power n for both int and double data types. (Use the concept of function overloading)

8. Write a function, which will take two objects of Distance Class as arguments and returns the largest one. Include a main () program to implement this function of the distance class.

9. Write a class to represent a vector (a series of float values). Include member functions to perform the following tasks:

- (a) To create the vector
- (b) To modify the value of a given element
- (c) To multiply by a scalar value
- (d) To add a vector to another
- (e) To display the vector in the form (10, 20, 30)

10. Demonstrate the use of static variables and static function in a class by using it to count the number of objects created in the program, having a static function to display the count.

11. Imagine a check-post at a bridge. Car passing by the check-post are expected to pay Rs. 50 as tax. Most of the cars pay but sometimes a car goes without paying the tax. The check-post has to keep track of number of cars and amount collected. Create a class check to implement this problem. The data members of the class are no, to count number of class and amount to keep track of the amount collected. Write member function paying for cars which are paying the tax and another function nopay for cars not paying the tax, also write a function to display number of cars passed and amount collected. Write a menu driven main program with option for paying car, another for not paying car, a option to display the result and a exit option. Create a single object of check type to test the class.

12. Create a class date which stores date in dd-mm-yyyy format. Include appropriate constructors to initialize the objects. Write a member function which gives the differences of given two dates as number of days. Another function to which days can be added so as to given the date after addition of days. Check the class by creating objects of the date class.

Checking program should be menu driven.

13. Create a class that contains variables for storing feet and its equivalent value of inches. Pass to the class's constructor no. of feet and have the constructor display the no. of inches.

14. Create a function `sleep()` that pauses the computer for the number of seconds specified by its single argument. Overload `sleep()` so it can be called with either an integer or a string representation of an integer. (e.g. `sleep(10)` & `sleep("10")` both should be valid)

15. Write a class to represent a Matrix. Include member functions to perform the following tasks:

Matrix

Data Members

Integer array of 10X10 elements.

Integer row, column //dimensions.

Member Functions

To create the Matrix.

To add a Matrix to another.

To subtract a Matrix by another.

To multiply a Matrix to another.

To multiply a Matrix by a scalar.

To divide a Matrix by a scalar.

To transpose a Matrix.

To modify the value of a given element.

To display the Matrix

16. Create a class Matrix with the following data members :

`int **p` and `int d1,d2`; include a parameterized constructor that takes two arguments and allocates the memory for a two dimension matrix with `d1` and `d2` dimensions.

Also include a destructor. Overload `+`, `-`, `*` on objects of Matrix.

Also overload `<<` and `>>` on objects of Matrix.

17. Given the following class specifications and using friend as a bridge, write a function to calculate the volume, assign it to member `vol` in class `volume` and display the value of `vol`.

```
class cylinder { int r,h};
```

```
class volume { long vol};
```

18. Following are the class specifications:

```
class A { int a};
```

```
class B { int b};
```

Using a friend function, calculate the max of two objects and display it.

19. Write a class to represent a vector (a linear array). Include member functions.

- default constructor to create vector dynamically of the size 1 and initialize its element to zero.

- parameterized constructor

- Overload the `+` operator to add two vectors

- Overload the `*` operator to multiply by a scalar value (scalar * vector or vector * scalar)

- Overload the `>>` operator to input a vector and the `<<` operator to display the vector in the form (10,20...).

20. Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible).

1. Compare two strings for equality (`==` operator)

2. Check whether first string is smaller than the second (`<=` operator)

3. Copy the string to another.

4. Extract a character from the string (overload `[]`)

5. Reverse the string.

6. Concatenate two strings (`+` operator)

21. Define two class `Polar` and `Rectangle` to represent points in the Polar and Rectangle systems. Use conversion routines to convert from one system to another.

22. Construct a class `Distance` having member variables `float` feet and `float` inches. Write a program to convert this class into the basic data type `float`, which will represent the total no. of inches of the class. Also include the code to accept the value of inches in a `float` variable and convert this basic data type into class `Distance` type having feet and inches as member variables.

23. Assume that the bank maintains two kinds of accounts for customers, one called savings account and another called current account. The saving account provides interest and withdrawal facilities but no cheque book facility while current account provides no interest. Facilities but provides with cheque book, also the current a/c holder

should maintain a minimum amount in a a/c else he has to pay service charges. Using inheritance concept create a base class account that stores account holder name, account no, and type of account, from this base class derive two classes sav_acc and cur_acc.

These classes should include members

- 1) to accept deposit and update the balance
- 2) display balance
- 3) withdraw amount and update the balance
- 4) compute interest
- 5) check minimum balance and impose penalty.

24. Create two classes Grade and Student. The class Grade has data members Grade while student has data members such as roll no, name, and total marks of the student. Making use of data of both the Classes print the roll no, name, and grade of each student whose grade is set by the grade class.

25. Write a program that creates a base class called num. Have this class hold an integer value and contain a virtual function called shownum().

Create two derived classes called outhex and outoct that inherit num. Have the derived classes override shownum() so that it displays the value in hexadecimal and octal respectively.

26. Make the use of the write function to display your name in the following fashion.

```
n
na
nam
name
nam
na
n
```

27. Write a program to read a list containing item name, item code, and cost interactively and produce a three column output as shown below:

NAME	CODE	COST
C++	101	233.81
JAVA 2	32	456.34
HTML	31	99.00

28. Create a class phonebook having two data members to hold the name and phone number of that person. Define appropriate constructors and member functions to maintain a phonebook. Write a program to create this phonebook in a binary file and read it back from the same file. Also include the facility to update a phone number, given a name. Search that name into the file and update the phone number.

29. Write a program that reads a file and creates another file which is identical to the first one except that the consecutive spaces are replaced by one space. Use command line arguments to supply the input and output filenames at runtime.

30. Create a generic class Stack. Create push and pop member functions to perform push and pop operations.

31. Write the BubbleSort function as a function template. Provide a specialization of the function for strings.

32. Write a program which copies its standard input, line by line, to its standard output.

33. Write a program which copies a user-specified file to another user-specified file. Your program should be able to copy text as well as binary files.

34. Write a program with the following:

- (a) A function to add two double type numbers from keyboard.
- (b) A function to calculate the division of these two numbers.
- (c) A try block to throw an exception when a wrong type of data is keyed in
- (d) A try block to detect and throw an exception if the condition "divide-by-zero" occurs
- (e) Appropriate catch block to handle the exceptions thrown.

35. Write a program that reads the name "Martin", "Luther", "King" from the keyboard into three separate string objects and then concatenates them into a new string object using

- (a) + operator and
- (b) append() function.

MCA
Semester-II

ADVANCE COMPUTER NETWORK

Unit - 1

Introduction: Definition, Internetwork, Intranetwork, Extranetwork, Brief History, ARPANET, OSI, ITU-T.

Network Models: ISO-OSI reference model, TCP/IP Protocol Suite, ATM model, SNA model

Unit - 2

Physical Layer: Design Issues, Hub, Repeater, data, signals, bitrate, baudrate, bandwidth, Modulation (A2A, A2D, D2A, D2D), Multiplexing, Physical specification, Transmission modes, modes of transfer, Transmission media (Guided and Unguided), ISDN, Multicasting, Broadcasting, Unicasting.

Unit - 3

Data Link Layer – Design issues, Bridge, Switch, LAN Topologies, Error Control, Error detection and correction, Flow Control, Access Control, ARQ, CSMA, CSMA/CD, CSMA/CA, IEEE 802 standard, MAC sub-layer, LLC sub-layer, MAC addressing, framing, frame relay, ATM relay, Ethernet, Bit-oriented Protocol, Character-oriented Protocol, SDLC, HDLC, polling and selecting.

Unit - 4

Network Layer-Design Issues, Router, 3-way switch, Routing, Types of Routing, Link state routing, distance vector routing, Packets, IP packet, logical addressing, IPV4, IP addressing, CIDR, sub-netting, ARP, RARP, ICMP

Unit - 5

Transport Layer – Design Issues, end-to-end delivery, Error control, flow control, TCP protocol, UDP protocol, TCP packet, UDP datagram, Congestion control, Quality of service, Port Addressing, Segments & reassembly, Gateway, Protocol Converter.

Advanced Topics: IPv6

Textbooks:

1. Data Communications and Networking, Behrouz A. Forouzan, 3rd Edition, Tata McGraw- Hill.
2. Computer Networks: A. S. Tannenbaum, D. Wetherall, Prentice Hall, Imprint of Pearson 5th Ed

Reference Book:

1. Understanding Data Communications and Networks, William A. Shay, 2nd Edition, Vikas Publications

List of Practical:

1. Design and study of Straight-Through Cable.
2. Design and study of Cross-over Cable.
3. Design and study of Roll-over Cable.
4. Study of network command in Windows operating system.
5. Study of CISCO Packet Tracer Software.

MCA/ MCA (LE)
Semester-III
JAVA PROGRAMMING

Unit - 1

History and evolution of Java: Creation of Java, Java Byte Code, Java Virtual Machine, Difference between Java and C++, Java program structure, Java Tokens. Overview of Java: First simple program of Java, Implementing Java program. Data types, variables and constants: Primitive and non primitive data type, Type conversion and casting, Operators.

Unit - 2

Control Statements: Selection statements, Iteration Statements, Jump statements.

Methods: Methods overview, Call by value, Call by reference, Recursion. Introduction to Arrays: One dimensional, two dimensional, multidimensional.

Introduction to object oriented programming: Class, Objects, Constructors, Method Overloading, Method Overriding, Inheritance, Final keyword, Abstract method and Classes, Visibility Control.

Unit - 3

Interfaces: Introduction, Defining Interfaces, Implementing Interfaces.

Packages: Java API Packages, Adding classes to package.

Exception handling: Exception classes in Java, Type of errors, Compiling time error, Run time errors, Use of TRY and CATCH

Unit - 4

Multithreading, Basic idea of multithreaded programming, the life cycle of a thread, Creating thread with the thread class and runnable interface, Thread synchronization, Thread scheduling.

IO package: Input streams, Output streams, Object serialization, Deserialization.

Unit - 5

GUI-Introduction to AWT programming, Layout and component managers, Event handling, Applet class, Applet life-cycle, passing parameters embedding in HTML

AWT- Overview of AWT, AWT Components, Menu and Dialogs, Layout Manager

Text Books:

1. Herbert Schildt, The Complete Reference for Java, TMH publication

Reference book

1. E. Balagurusamy, Fundamental of Java programming

LIST OF PRACTICALS:

1. To find the sum of any number of integers entered as command line arguments
2. To find the factorial of a given number
3. To learn use of single dimensional array by defining the array dynamically.
4. To learn use of length in case of a two dimensional array
5. To convert a decimal to binary number
6. To check if a number is prime or not, by taking the number as input from the keyboard
7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
8. Write a program that show working of different functions of String and StringBuffer classes like setCharAt(), setLength(), append(), insert(), concat() and equals().
9. Write a program to create a `—distance||` class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer
10. Modify the `—distance||` class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.

11. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions(from lower to higher data type)
12. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
13. Write a program to show the use of static functions and to pass variable length arguments in a function.
14. Write a program to demonstrate the concept of boxing and unboxing.
15. Create a multi-file program where in one file a string message is taken as input from the user and the function to display the message on the screen is given in another file (make use of Scanner package in this program).
16. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate fibonacci series is given in a different file belonging to the same package.
17. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages
18. Write a program –DivideByZero|| that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
19. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.
20. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).
21. Write a program to demonstrate priorities among multiple threads.
22. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).
23. Write a program to create URL object, create a URLConnection using the openConnection() method and then use it examine the different components of the URLand content.
24. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.
25. Write a program that creates a Banner and then creates a thread to scrolls the message in the banner from left to right across the applet's window.
26. Write a program to get the URL/location of code (i.e. java code) and document(i.e. html file).
27. Write a program to demonstrate different mouse handling events like mouseClicked(), mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().
28. Write a program to demonstrate different keyboard handling events.
29. Write a program to generate a window without an applet window using main() function.
30. Write a program to demonstrate the use of push buttons.

MCA/ MCA (LE)
Semester-III
THEORY OF COMPUTATION

Unit - 1

Series and Progression, Principle of Mathematical Induction, Pigeon-hole principle. Introduction to automata theory, Alphabets, String, Language, Grammar, Chomsky Hierarchy for Formal Languages and Grammar types.

Unit - 2

Finite Automata (FA): Definition, transition function, transition diagram, transition table, String/Language acceptability by FA, Types of FA, NFA to DFA conversion, Minimization of DFA, Application of FA, Myhill-Nerode Theorem.

Regular Language (RL): Definition, closure properties, regular grammar (RG), regular expression, rules of expression, transformation of regular expression to Finite automata, Arden's Theorem, DFA to regular expression transformation, Pumping Lemma for regular language.

Unit - 3

Pushdown Automata (PDA): Definition, String/Language acceptability by PDA, Types of PDA, design of PDA, Application of PDA.

Context Free Language (CFL): Definition, closure properties, Context Free Grammars (CFG), parse tree, ambiguities in grammar, Pumping Lemma for CFL, normal forms, Chomsky normal form, Greibach normal form.

Unit - 4

Linear Bounded Automata (LBA): Definition, String/Language acceptability by LBA, Types of LBA, design of LBA, Application of LBA.

Context Sensitive Grammar (CSG): Definition, closure properties, Context Sensitive Grammar (CSG), Pumping Lemma for CFL

Unit - 5

Turing Machine: Definition, String/Language acceptability by TM, representation to TM, Types of TM, Universal Turing Machine (UTM), two-way infinite TM, multi-tape TM, design of TM, Application of TM, halting problems of TM, Decidability.

Recursive Enumerable Language (REL): Definition, closure properties, Recursive Enumerable Grammar.

Advanced Topics: Mealy-Moore Machine, Church-Turing Thesis.

Textbooks:

1. K.L.P Mishra, Theory of Computer Science

Reference Book

1. Aho, Ullmann, Theory of computation

MCA/ MCA (LE)
Semester-III
DATA STRUCTURE USING C

Unit - 1

Introduction to Data structures: Definition, Classification and Operations on data structures, DMA, asymptotic notation, Algorithm complexity. Big O notation.

Linked List: Linked List-Types of linked list, singly linked list, doubly linked list, circular linked list, Circular doubly linked list. Application of linked list-Polynomial representation and addition.

Unit - 2

Stack and Queue: Stack-Array and linked list representation of stack, operations on stack, PUSH and POP. Applications of stack, Conversion from infix to postfix and prefix. Evaluation of prefix and post fix expression using stack. Recursion. Queue-Array and linked list representation of queue. Types of Queue, various operations on queue. Applications of Queue.

Unit - 3

Graphs: Graphs-related definition, graph representation-adjacency matrix, adjacency list, adjacency multilist, traversal DFS, BFS, minimum spanning tree, shortest path algorithm, kruskal and prim's algorithm.

Unit - 4

Trees: Trees-Basic terminology, binary tree, binary tree representation, complete binary tree, Extended binary tree, Array and linked list representation of binary tree, Traversing binary trees, Threaded binary tree, B-tree, 2-3 tree, AVL tree, Insertion and deletion in binary search tree, forest, conversion of forest into tree, heap definition, max heap and min heap.

Unit - 5

Sorting and Searching: sorting- types of sorting, inplace sorting, stable sorting, Bubble sort, selection sort, insertion sort, quick sort, merge sort, shell sort, heap sort, Radix sort, counting sort
Searching-Linear and Binary search, Hashing basics, methods, collision resolution, chaining, linear probing, rehashing.

Lexicographical ordering, LCP computation, suffix tree, splay tree, treaps, red-black tree

Text Books:

1. G.S. Baluja, Data Structure and Algorithms
2. Advanced Data structures, Peter Bras

List of practical:

1. Program to create, insert, delete and display operations on single linked list.
2. Program to create, insert, delete and display operations on double linked list.
3. Program to create, insert, delete and display operations on circular single linked list.
4. Program to split a single link list.
5. Program to reverse a single linked list.
6. Program to implement insertion sort.
7. Program to implement PUSH and POP operations on Stack using array method.
8. Program to implement PUSH and POP operations on Stack using Linked List method.
9. Program to implement insert and delete operations on Queue using array method.
10. Program to implement insert and delete operations on Queue using Linked List method.
11. Program to implement insert and delete operations on Priority Queue .
12. Program to implement insert and delete operations on Double Ended Queue.
13. Program to evaluate postfix expression by using Stack.
14. Program to construct Binary Search Tree and implement tree traversing techniques.

15. Program to delete a leaf node from binary search tree.
16. Program to implement Selection Sort.
17. Program to implement Bubble Sort.
18. Program to implement Operations on Circular Queue.
19. Program to implement Quick Sort.
20. Program to Find number of Leaf nodes and Non-Leaf nodes in Binary Search Tree.

MCA/ MCA (LE)
Semester-III
ADVANCED SOFTWARE ENGINEERING

Unit - 1

Software Concepts: The Evolving role of software, software myths, system concepts, characteristics of system, Elements of System, SDLC, The role of System Analyst, Software Application domains, Legacy Software, The Software Crisis, principles of software engineering. Requirement Analysis: Requirement analysis tasks, Analysis principles. Software prototyping.

Unit - 2

Process models: Perspective model: The process of software development, waterfall, Incremental, spiral, COCOMO, concurrent development. Agile process models- what is Agility, Agile Process models, xp, ASD, DSDM, SCRUM, CRYSTAL, FOD AM. Capability Maturity Model, Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis.

Unit - 3

Designing: Software Design: principles, Abstraction, Modularity, Software architecture, Cohesion and Coupling, Architectural design and procedural design, Refactoring, Structured Analysis, Evolution of object models, UML: an Introduction, Views and Diagrams, extended UML, User Interface Design and Computer interface design, Interface standards. Programming languages and coding, Language classes, Code documentation, Code efficiency.

Unit - 4

Testing: Testing Techniques: software testing, functional and non- functional testing: white box, black box testing, different types of testing: static , structural, desk checking, code walk through, code inspection, unit/code functional, code coverage, code complexity, statement, path, condition, function coverage, cyclomatic complexity, requirements based, compatibility, domain, integration, system integration pair, acceptability, scenarios, defect bash, deployment, beta, stress, interoperability, acceptance, performance/load, regression, adhoc, Software maintenance.

Trends in Software Engineering: Reverse Engineering and

Re-engineering, wrappers.

Unit - 5

Software Quality Assurance: Quality Concepts, The Quality movement, software quality Assurance, – Product quality and process quality ,Garvin’s Quality Dimensions, McCall’s Quality factors, Software Reviews, formal technical reviews, formal approaches to SQA, Statistical Software Quality Assurance, Software reliability, Information to ISO – Standard. Function point, Metrics. Cleanroom software engineering, Challenges of software engineering for distributed systems.

Text Books:

1. “An Integrated Approach to Software Engineering”, Pankaj Jalote, IIIrd Edition, Narosa Publishing House.
2. “Software Engineering: A Practitioner’s approach”, Roger S. Pressman, McGraw-Hill.

Reference Books:

1. “Software Engineering: Principles and Practices”, Waman S. Jawadekar, Tata McGraw-Hill.
2. “Software Engineering”, Ian Sommerville, Pearson Education.
3. S. L. Pfleeger, Software Engineering: Theory and Practice, Pearson Education.

MCA/ MCA (LE)
Semester-III
DISCRETE MATHEMATICS STRUCTURE

Unit-1

Set Theory: Element of set, Types of set, Operation on Sets, Union, Intersection and Complement of Sets, Cartesian product, Venn diagram, Different Laws on sets.

Relation and Function: Types and Composition of relation, transitive composition, Symmetric-Transitive Composition, Reflexive-Transitive composition, Partial Order Relation, Equivalence Relation, Domain and Range, Onto, Into and One-One Function, Composite and Inverse Function.

Unit-2

Combinatorics: Mathematical inductions, Strong induction and well ordering, The basics of counting, The pigeonhole principle, Permutations and combinations, inclusion and exclusion and applications.

Unit-3

Proposition: Proposition, First Order Logic, Basic Logic Operation, Logical Equivalence, Truth Table, Normal Forms, Predicates and Quantifiers, POSET, Hasse Diagram, Well Ordered Set, Complete Order.

Lattices and Boolean algebra: Properties of lattices, Complete Lattice, Distributive Lattice, Bounded Lattice, Lattice Homomorphism, Lattices Isomorphism, Least Upper Bound, Greatest Lower Bound

Unit-4

Dimensional Geometry: Graph Theory, Concepts Graph, Sub graph, Isomorphic Graph, Homeomorphic Graphs, Weighted Graphs, Shortest Paths in weighed graphs (Dijkstra's algo), Operations on Graphs, Directed Graph, Matrix Representation On Graphs, Cyclic Graphs, Tree, Rooted Tree, Labeled Graph, Weighted Graph, Decision trees or Sorting Tree, Spanning Tree, Binary Trees, Algorithms- Prim's, Kruskal.

Unit-5

Algebraic Structures: Properties, Binary operation, groupoid, semi group, monoid, Group, abelian group, Subgroup, cyclic group, homeomorphism and isomorphism of group, Definition and examples of rings and field.

Text Books:

1. Elementary Abstract Algebra 1996 B.R. Thakur Ram Prasad And Sons
2. Discrete Mathematics Aug-2006 Dr.D.C. Agrawal Shree Sai Prakeshan

Reference Books:

1. Naive Set Theory 1960 Paul Richard Halmos

MCA/ MCA (LE)
Semester-III
COMPUTER GRAPHICS

Unit - 1

Fundamental of Computer Graphics:- Definition, classification and application, Development of hardware and software for computer graphics, DisplayDevices, hardcopy devices, Interactive input devices, display processor, line drawing , various algorithms and their comparisons, circle generation:-Bresenham's mid point circle drawing algorithm, midpoint ellipse drawing algorithm.

I/O Devices:- Random and Raster scan display, frame buffer, persistence, resolution, character generation

Unit - 2

Scan Conversion:- scan conversion line, circle ,ellipse, arcs, sectors, polygon, region filling, area filling, scan line algorithm, boundary fill, flood fill algorithms, aliasing effects and ant aliasing.

Transformations:- 2D and 3D transformation:- scaling, rotation, shearing, reflection, homogeneous coordinate system, compositetransformation, rotation about arbitrary point(2D), rotation about arbitrary axis(3D)

Unit - 3

2D viewing and clipping:- concept of window , viewport, window to viewporttransformation, graphic pipeline, panning , zooming

Line clipping algorithms, Cohen Sutherland polygon clipping, Sutherland Hodgeman algorithm, Weiler Atherton

3D clipping:- Normalized view volumes, viewport clipping, clipping in homogeneous coordinate. Liang Barsky algorithm.

Projection:- Parallel and perspective projection and different types of projections, 1,2 vanishing points.

Unit - 4

Hidden surface:- depth buffer(Z buffer, A buffer) back face , painters algorithm , area sub division, depth sorting method, BSP trees

Shading and illumination model-Light sources, diffuses, peculiar reflection, reflected light intensity level, surface shading, phong shading, gourard shading, color model. RGB, CYMK, YIQ, HSV.

Unit - 5

Curves and Fractals-Generation, classification and dimension, basic fractal images, Koch curve, spearpinski triangle, mandelbort and Julia set, applications of fractals.

Text Book:

1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
2. [Donald D Hearn](#), M. Pauline Baker, Computer Graphics, Pearson Education, 2nd edition.

Reference Book:

1. G.S Baluja "Computer Graphics and Multimedia" , DhanpatRai Publication

MCA/ MCA (LE)
Semester-IV
ANALYSIS AND DESIGN OF ALGORITHMS

Unit-1

Introduction to Algorithm:

Definition, Criteria of Algorithm, Time and Space complexity, asymptotic notation: Big Oh, Omega and Theta, Worst, Average and Best case analysis, Recurrence relation: Master method, Substitution method, Analysis of algorithm, Design of Algorithm, Types of algorithm strategies, case study of insertion sort

Unit-2

Brute-force approach:

Sequential search, Selection sort

Divide-and-Conquer:

Binary search, Mergesort, Quicksort, Matrix Multiplication using Strassen's method.

Unit-3

Dynamic Programming:

Elements of dynamic programming, Matrix-chain multiplication, Longest common subsequence, Fibonacci Sequence, Floyd-Warshall Algorithm

Greedy Algorithms:

Elements of Greedy Algorithm, Minimal spanning tree Algorithm (Prim and Kruskal), Shortest distance Algorithm (Dijkstra), Huffman trees for optimal encoding.

Unit-4

Backtracking:

Elements of Backtracking, Knapsack problem, 8-Queens Problem, Graph coloring, Travelling-Salesman Problem.

BRANCH AND BOUND:

Basic method, 0/1 knapsack problem, Travelling Salesman problem

Unit-5

String Matching Algorithms:

Naïve algorithm, KMP Algorithm, Finite-automaton based searching, Boyer-Moore Algorithm.

Complexity classes:

P, NP, NP-hard, NP-complete, P vs. NP Problem, Relation among P, NP, NPC and NPH.

Text Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Prentice Hall Publications, 3rd edition.

Reference Books:

1. Fundamental of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, [Sanguthevar Rajasekaran](#), W. H. Freeman Silicon Press, 2nd edition

MCA/ MCA (LE)
Semester-IV
WEB TECHNOLOGIES

Unit-I : HTML

Concepts of Hypertext, Versions of HTML, Basic text formatting, Head & Body Sections, Inserting texts, Images, Hyperlinks, Backgrounds and Color controls. Different HTML tags, Table layout and presentation, Use of Fonts, List types and its tags, Use of Frames and Forms in web pages. Introduction to HTML5.

Unit-II

Cascading Style Sheet- Introduction, Level s of CSS inline style sheet, External style sheet, classes, class and ID method, DIV and SPAN tags, introduction to CSS3.

JavaScript- Introduction, Language Basics-Variables, operators, statements, functions, JavaScript Events, Such as onclick, mouse out, mouseover etc, form validation.

Unit-III

XML-Introduction, XML Fundamentals, XML Syntax, Accessing Data from XML Documents.

J Query- Introduction, J query Syntax, J query selectors, Events.

Unit-IV

PHP – Introduction to Scripting Language PHP, Installation and Configuration of PHP, Data types in PHP, PHP Syntax, Comments, Variables and Constants, Embedding PHP in HTML.

PHP Functions: user defined functions, Strings Concatenation, Strings functions.

Arrays: Creating Array and Accessing Array Elements, Control statements, Loops, form validation.

Unit-V

Working with forms: - CRUD – Select statements, Creating Database/Tables, Inserting values, Updating and Deleting, PHP with MYSQL, Creating Connections, Selecting Databse, Perform Database (Query).

Text Books:

1. Web Technologies, Black Book,DreamTechPress, Kogent Learning Solutions Inc, DreamTechPress, 2010 editon.

Reference Books:

1. Beginning PHP5, Apache, and MySQL Web Development, Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass, Wrox Publication, 2005 edition.

List of practical:

1. Create a web page by making use of the following tags: Head, Body, Bgcolor, text and submit.
2. Write a html program applying inline css.
3. write a html program using class based external style sheet
4. Write a java script program to design the simple Calculator
5. Write a java script program to find the factorial of given number
6. Write a javascript program to form validation in html.
7. Create a web form using php for login page.
8. Create a simple xml document with following details: Rollno, Sname, Contact, Email and Address.
9. Write a simple php script to perform crud operations.
10. Create a web form using php for enquiry details.

MCA/ MCA (LE)
Semester-IV
APPLIED MATHEMATICS (CALCULUS & STATISTICS)

Unit-1

Differential equation of first Order and first Degree: Linear Equations, Bernoulli's equation, Exact differential Equations.

Differential equation of first Order and Higher Degree: First Order Higher Degree Equations Solvable for x, y, p. Clairaut's form and Singular Solutions.

Unit-2

Linear Differential Equations of Higher order with Constant Coefficients: Auxiliary equation, Auxiliary equation having equal roots, Auxiliary equation having Imaginary roots, Particular Integral by general method, Particular Integral By special method, Homogeneous Linear ordinary Differential Equations,

Unit-3

Statistics: Introduction to statistics, Measures of central tendency-Mean, Median and Mode, Measures of dispersion, Mean deviation, Standard deviation and Coefficient of variation.

Unit-4

Correlation and Regression: Types of correlation, Method of studying correlation, Scatter diagram, Correlation graph, Coefficient of correlation, Compression of correlation and Regression studies, Method of least squares.

Unit-5

Probability: Definitions, Addition law of probability, Multiplication law of probability, Conditional probability, Baye's theorem.

Text Books:

1. H.K. Dass, Higher Engineering Mathematics, S. Chand Publishing & Company India Ltd. New Delhi (2012).

References Books:

1. DeFranza, Gagliardi. Introduction To Linear Algebra With Applications, New Age International (P) Ltd, New Delhi (2012).

2. A.K. Sharma, Linear Algebra, Discovery Publishing House, 2007.

3. D.N. Elhance, Fundamentals of Statistics, Kitab Mahal, 1960.

MCA/ MCA (LE)
Semester-IV
DATABASE MANAGEMENT SYSTEM with ORACLE

Unit - 1

Purpose and advantages of DBMS, view of data, DBMS architecture and data independence, database languages. Classification of DBMS, schema and sub schema. Database administrator and users, data dictionary, data modeling using ER model, Entities, attributes and relationships, different types of attributes, ER diagrams, specialization and generalization, relationship, types of degree higher than two

Unit - 2

Domains, relations, kinds of relations, various types of keys, candidate, primary, alternate and foreign keys. Codd's rule

Relational algebra,: - relational algebra with extended operations, tuple relational calculus, domain relational calculus, set operation, aggregate functions, null values, join relations.

Unit - 3 : Relational database design:

Pitfalls in relational database design, trivial and non trivial dependencies, closure set of dependencies and of attributes.

Introduction to normalization, non loss decomposition, FD diagram, 1st,2nd,3rd BCNF, 4NF, 5NF

Basic SQL: - DDL, DML and DCL commands, specifying constraints in SQL, select statement, additional features of SQL, PL/SQL, cursor, trigger, view

Unit - 4 : Transaction management

Basic concepts, ACID properties, transaction states, implementation of atomicity and durability. Basic idea of serializability. Concurrency control- lock based protocols, time stamp based protocols, validation based protocols.

Unit - 5: Advance topics in DBMS

Meaning of deductive databases, Internet technology and its relevance to the DBMS, Technology of multimedia databases, Overview of digital libraries, Mobile databases, Distributed and parallel DBMS. Use of B+ tree is in the database.

Text Books:

1. Korth, Sudarshan, Database system concepts, McGraw hill

Reference books:

1. Ivan Byross, Programming in PL/SQL,
2. [Elmasri & Navathe, Fundamentals of Database Systems, 7th Edition](#), Pearson education

MCA/ MCA (LE)
Semester-IV
COMPILER DESIGN

Objective: This course is designed to study the internal working of Compilers. We will study translation methods and parsing techniques.

Unit - 1

Introduction to Compiling

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools - Lexical Analysis -Role of Lexical Analyzer – Input Buffering – Specification of Tokens, Symbol Table,LEX.

Unit - 2

Syntax Analysis

Role of the parser –Context-Free Grammars – Top Down parsing - Recursive Descent Parsing - Predictive Parsing – Bottom-up parsing - Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers - SLR Parser - Canonical LR Parser - LALR Parser, FIRST-and –FOLLOW, YACC.

Unit - 3

Intermediate Code Generation

Intermediate languages – Declarations – Assignment Statements – Case Statements – Back patching – Procedure calls, Three Address Code Generation

Unit - 4

Code Generation

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

Unit - 5

Code Optimization

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

Advance topics: C# Compiler

Text Book

1. A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools, Pearson Education, 2007, 2nd edition

Reference Book

1. A.A. Puntambekar, Compiler Design, Technical Publications, 2010
2. D. M. Dhamdhare, Compiler Construction--Principles and Practice, Second edition, Macmillan India, 1997

MCA/ MCA (LE)
Semester-IV
(ELECTIVE-1-A)
ARTIFICIAL INTELLIGENCE

Unit-I

Introduction of Artificial intelligence:- various definition of AI, application and AI technique. Production system, control strategies, reasoning, forward and backward chaining.

Intelligent Agents:- Definition of a rational agent, reflex model based, utility based agents, The environment in which particular agent operates.

Unit-II

Problem solving search and control strategies:- General problem solving, production system, control strategies, exhaustive search. DFS ,BFS matching, Indexing .

Heuristic Search techniques:- Hill climbing , branch and bound techniques, A* algorithm, AO* algorithms, AND/OR graphs, Problem reduction. Constraint satisfaction problem. Alpha -Beta pruning. Uniform Cost search. Genetic Algorithm. Mini max and game trees.

Unit-III

Knowledge Representation:- General concepts of knowledge, Approaches of knowledge representation, predicate logic to represent knowledge, Resolution, Unification Algorithm, First order predicate Calculus, Skolemization, Horn's Calculus, Semantic network, frame system and value inheritance, scripts and conceptual dependency.

Symbolic reasoning under Uncertainty;- Non Monotonic Reasonic

Statistical Reasoning:- Probability and Bayes Theorem, Certainty factors and Rule based system, Bayesian network , fuzzy logic and application.

Unit-IV

Natural Language Processing;- Introduction, steps, syntactic processing, semantic analysis, parsing techniques,

Planning;- Overview an example, domain the block world, component of planning systems, goal stack planning, non-linear planning, Symbolic centralized VS reactive distributed, partial order planning algorithm.

Unit-V

Uncertainty: different types of uncertainty, degree of belief and degree of truth, various probability constructs, prior probability, conditional probability, probability axioms, probability distribution and joint probability distribution. Baye's rule, Other approaches to modeling uncertainty such as Dampster-Shafer theory.

Learning And Expert system-; Meaning, role learning, learning by taking advice, learning from examples. Explanation based learning. Expert system and its architecture, various expert systems shell, Vidwan framework, Knowledge acquisition, case studies.

PROLOG;- Introduction ,converting English to Prolog, Facts and rules, goals, Prolog terminology, variables, control structure, arithmetic operator. inputs/output and streams.

Text Books:

1. Artificial intelligence, [Elaine Rich](#), [Kevin Knight](#), Mc Graw Hill, 3rd edition

Reference Books:

1. Artificial Intelligence: A Modern Approach, [Stuart J. Russell](#) and [Peter Norvig](#), Prentice hall, 3rd edition

MCA/ MCA (LE)
Semester-IV
(ELECTIVE-1-B)
CRYPTOGRAPHY AND NETWORK SECURITY

Unit-I

Introduction to Cryptography: Attacks, Services & Mechanisms, Security, Attacks, Security Services. Conventional Encryption: Classical Techniques, Conventional Encryption Model, And Steganography, Classical Encryption Techniques.

Unit-II

Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher, Modes Of Operation.

Unit-III

Public Key Encryption: Introduction To Number Theory, Modular Arithmetic, Prime Numbers. Euler's Totient Function, Principles of Public Key Cryptosystems, Diffie Hellman Key Exchange, RSA Algorithm, The Chinese Remainder Theorem.

Unit-IV

Key Management & Distribution And User Authentication

Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Public Key Infrastructure. Remote user Authentication Principles, Remote User-Authentication Using Symmetric Encryption, Kerberos

Unit-V

Network & Internet Security:

Transport-Level Security – Web security Considerations, Secure Socket Layer and Transport layer Security; **E-Mail Security** – Pretty Good Privacy, S/MIME. **IP Security** – IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange, Primarily Testing, Fermat's Theorem.

Text Books:

1. Cryptography and Network Security: Principles and Practices, William Stallings, Prentice Hall, 5th edition.

Reference Books:

1. Cryptography and Network Security, Atul Kahate, Tata McGraw-Hills, 8th edition

MCA/ MCA (LE)
Semester-IV
(ELECTIVE-1-C)
ENTREPRENEURSHIP

Unit-I

Meaning, elements, determinants and importance of entrepreneurship and creative behaviour. entrepreneurship and creative response to the society "problems and at work. Dimension of entrepreneurship: intrapreneurship, technopreneunship, cultural entrepreneurship, international entrepreneurship, netpreneurship, ecoprenenrship and social entrepreneurship,*each with case studies etc.

Unit-II

Entrepreneurship and Micro, small and medium enterprise. Concept of business groups and role of business houses and family business in India. The contemporary role models in Indian business: their values, business philosophy and behavioural orientations. Conflict in family business and its resolution.

Unit-III

Public and Private system of stimulation, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology and industrial accommodation etc. Role of industries/entrepreneur's association and self help groups. The concept ,role and functions of business incubators, angel investors, venture capital and private equity funds.

Unit-IV

Sources of business ideas and tests of feasibility. Significance of writing the business plan/ project proposal. Contents of business plan/project proposal. Designing business processes, location , layout, operation, planning & control: preparation of project report (various aspects of the project report such as size of investment, nature of product ,market potential etc. may be covered).Project submission/presentation and appraisal thereof by external agencies such as financial/non financial institutions.

Unit-V

Mobilising resources for start-up. Accommodation and utilities. Preliminary contracts with the vendors, suppliers, bankers, principal customer and the aspects of contract management. Basic startup problems. Aspects of small business management. Nature of planning in small business. Organizational structures suitable for small business. Financial : Preparation of budgets, integrated ratio analysis, assessing business risks(leverage analysis).Marketing : product planning & development, creating and protecting market niche ,sales promotion, advertising and product costing and pricing policies.HR issues in small business.

Text Books:

1. Management of small scale enterprise, Desai ,Vasant, Himalaya Publishing house

Reference Books:

1. The 10 Commandments for building a Growth Company, Brandt,Steven C, Macmillan Business books, New delhi

MCA/ MCA (LE)
Semester-IV
(ELECTIVE-1-D)
FUZZY LOGIC AND NEURAL NETWORK

Unit - 1

Introduction : Definition of ANN-Biological Neural Networks-Applications of ANN-Typical Architectures-Setting the weights-Common Activation functions-Development of Neural Networks-McCulloch-Pitts Neuron Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and synaptic)

Simple Neural Nets For Pattern Classification: General discussion - Hebb net – Perceptron- Adaline

Unit - 2

Single Layer Feed Forward Neural Networks: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

Multilayer Feed Forward Neural Networks: Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements

Unit - 3

Pattern Association: Training Algorithm for pattern Association, Heteroassociativity memory neural network application Auto associative net-Iterative Autoassociative net-Bidirectional Associative Memory Application.

Unit - 4

Crisp Sets And Fuzzy Sets: Crisp sets: overview – Notion of Fuzzy sets- Basic concepts- Classical Logic-Fuzzy Logic – Operations on Fuzzy sets- Fuzzy complement- Fuzzy Union – Fuzzy Intersection- Combinations of operations- General Aggregation operations

Fuzzy Relations : Crisp and Fuzzy relations- Binary relations – Binary relations on a single set – Equivalence and similarity relations- compatibility or tolerance relations – orderings – morphisms – Fuzzy relation equations..

Unit - 5

Fuzzy Measures: Fuzzy measures- Belief and Plausibility measures- Probability measures – Possibility and Necessity measures- Relationship among classes of Fuzzy measures.

Uncertainty And Information: Types of Uncertainty – Measures of Fuzziness – Classical measures of Uncertainty – Measures of Dissonance – Measures of confusion – Measures of Non-specificity – Uncertainty and information – Information and complexity – principles of Uncertainty and information.

Advance Topics: -Applications inEngineering, Medicine, Management and decisionmaking in Computer Science.

Text Book

1. LaureneV. Fausett, “Fundamentals of Neural networks-Architectures, Algorithms and Applications”, Pearson Education, 2011.
2. George J. Klir& Tina Folger A., “Fuzzy sets Uncertainty & Information”, PHI Learning Pvt.Ltd,2010

References

1. James. A. Freeman and David.M.Skapura, "Neural Networks Algorithms, Applications and Programming Techniques ",Pearson Education, Sixth Reprint, 2011.

MCA/ MCA (LE)
Semester-IV
(ELECTIVE-1-E)
DIGITAL IMAGE PROCESSING

Unit 1:

Digital Image Fundamental

Introduction, components of image processing systems, image sensing and acquisition, image sampling and quantization, pixel operation, Light, Brightness adaption and discrimination, Imaging Geometry, Perspective Projection, Spatial Domain Filtering

Unit 2:

IMAGE ENHANCEMENT TECHNIQUES

Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging – Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters – Homomorphic filtering, Color Image Enhancement

Unit 3:

Image Transformation

Discrete Fourier transform, Walsh Transformation, Hadamard Transformation, Cosing transformation, HAAR transformation, Wavelet transformation, Slant – Karhunen – Loeve transforms

Unit 4:

Image Compression

Encoder-Decoder model, Types of Redundancies, Lossy and Lossless compression, Entropy of an information source, Shannon's 1st Theorem, Huffman Coding, Arithmetic Coding, Golomb Coding, LZW coding, Transform Coding, Sub-image size selection, DCT implementation using FFT, Run length coding, Symbol-based coding, JBIG-2, Bit-plane encoding, Bit-allocation, Zonal Coding, Threshold Coding, JPEG, Lossless predictive coding, Lossy predictive coding, Motion Compensation

Unit 5:

IMAGE SEGMENTATION AND REPRESENTATION

Edge detection – Thresholding - Region Based segmentation – Boundary representation: chain codes- Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors – Simple descriptors- Texture

Text Books

1. Digital Image processing, 3rd edition, Rafael C. Gonzalez and Richard E. Woods

Reference book

1. Fundamental of Image processing, Anil K. Jain, Prentice Hall

MCA/ MCA (LE)
Semester-V
DATA WAREHOUSING AND DATA MINING

Unit - 1

Overview and Concepts: Need for data warehousing, Basic elements of data warehousing, Differences between database systems and data warehouse, Planning and Requirements: Project planning and management, Collecting the requirements.

Unit -2

Architecture and Infrastructure: Data warehouse architecture and its components, Infrastructure and metadata, Data design and data representation, Principles of dimensional modeling, Data extraction, Transformation and loading, Data quality. Information access and delivery: OLAP in data warehouse, Data warehousing and the web.

Unit - 3

Data Mining Introduction : Basics of data mining, Different definitions of data mining and related concepts, Data mining process, Data preparation, Data cleaning and Data visualization, KDD process.

Unit - 4

Data Mining Techniques: Classification, Clustering, Association rules and Decision trees.

Unit - 5

Web Mining: Web content Mining, Web Usage Mining, Spatial Mining, Temporal Mining, Trends in Data Mining

Text Books:

1. J. Han and M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann.

Reference Books:

1. A.K. Puzari, Data Mining Techniques, University Press.

MCA/ MCA (LE)
Semester-V
LINUX AND SHELL PROGRAMMING

Unit - 1

Linux Introduction and File System: Linux introduction and file system - Basic Features, Different flavors of Linux. Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp&comm, View files, disk related commands, checking disk free spaces.

Unit -2

Essential Linux commands: Processes in Linux - process fundamentals, connecting processes with pipes, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron commands, kill, ps, who, sleep, Printing commands, touch, file related commands - wc, cut, dd, etc. Mathematical commands- bc, expr. Creating and editing files with vi & vim editor

Unit - 3

Security File Permission and Job Control: Security, File permissions and Job control, Users, group and ownership of files

Security levels and shell customization: Environment variables, File permissions: File attribute, permissions and changing file permissions, User masks, changing ownership and groups, Job control: process, jobs, foreground and background jobs

Unit - 4

Shell programming: Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks.

Unit - 5

Filter commands: pr, head, tail, cut, paste, sort, uniq, tr. Filter using regular expressions – grep, egrep, and sed, sorting and translating characters, Files with duplicate lines, counting character, words and lines and comparing files.

Text Book:

1. Unix - concepts & applications (third ed.) - sumitabha das, tata mcgraw hill publications

Reference Books:

1. Linux: the complete reference - sixth edition by richard petersen

List of practical:

1. Shell script program to check whether given file is a directory or not.
2. Shell script program to count number of files in a Directory.
3. Shell script program to copy contents of one file to another.
4. Create directory, write contents on that and Copy to a suitable location in your home directory.
5. Use a pipeline and command substitution to set the length of a line in file to a variable.
6. Write a program using sed command to print duplicated lines of Input.
7. Write a shell script program to display the process attributes.
8. Write a shell script to change the priority of processes.
9. Write a shell script to change the ownership of processes.
10. Write a shell script program to develop a scientific calculator

MCA/ MCA (LE)
Semester-V
OPERATION RESEARCH

Unit-1

Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem – Formulation of LPP, Graphical solution of LPP. Simplex Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions.

Unit -2

Transportation Problem: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method.

Unit -3

Assignment model: Formulation. Hungarian method for optimal solution. Solving unbalanced problem. Traveling salesman problem and assignment problem.

Unit -4

Sequencing models: Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines – Processing n Jobs through m Machines.

Unit -5

Dynamic programming: Characteristics of dynamic programming. Dynamic programming approach for Priority Management employment smoothening, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems. Games Theory, Replacement Models

Text books:

1. P. Sankara Iyer, "Operations Research", Tata McGraw-Hill, 2008.

Reference Books:

2. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005

MCA/ MCA (LE)
Semester-V
CLOUD COMPUTING

Unit-1

Introduction to Cloud Computing: Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS , Cloud computing platforms: Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.

Unit-2

Introduction to Cloud Technologies: Study of Hypervisors, Compare SOAP and REST, Web-services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization , Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenancy using cloud data stores, Data access control for enterprise applications.

Unit-3

Data in the Cloud: Relational databases Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Map-reduce, Features and comparisons among GFS,HDFS etc, Map-Reduce model.

Unit-4

Administrating the Clouds: Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, Establishing Identity and Presence.

Unit-5

Issues in Cloud Computing: Implementing real time application over cloud platform, Issues in Intercloud environments, QoS Issues in Cloud, Dependability, data migration, streaming in Cloud Quality of Service (QoS) monitoring in a Cloud computing environment, Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud.

Text Books:

1. Rajkumar Buyya, Christian Vecchiola, and S.Thamarai Selvi, "Mastering Cloud Computing", McGraw Hill Education Pvt Ltd.

Reference Books:

1. Gautam Shroff, "Enterprise Cloud Computing", Cambridge University Press.

MCA/ MCA (LE)
Semester-V
PYTHON PROGRAMMING

Unit - 1

Introduction: History, Features, Setting up path, Working with Python, Basic syntax, Variable and Data Types, Operator. Conditional Statements, Looping, Control Statements, String Manipulation

Unit - 2

Lists: Introduction, Accessing list, Operations, Working with lists, Function and Methods

Tuple: Introduction, Accessing tuples, Operations, Working, Functions and Methods.

Dictionaries: Introduction, Accessing values in dictionaries, working with dictionaries, Properties, Functions.

Modules: Importing module, Math module, Random module, Packages, Composition.

Unit-3

Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Functions

Exception Handling: Exception, Exception Handling, Except clause, Try ??? finally clause ,User Defined Exceptions.

Unit-4

OOPs concept: Class and object, Attributes, Inheritance, Overloading, Overriding, Data hiding.

Regular expressions: Match function, Search function, Matching VS Searching, Modifiers, Patterns

CGI: Introduction, Architecture, CGI environment variable, GET and POST methods, Cookies, File upload.

Database: Introduction, Connections, Executing queries, Transactions, Handling error.

Unit-5

Networking: Socket, Socket Module, Methods, Client and server, Internet modules.

Multithreading: Thread, Starting a thread, threading module, Synchronizing threads, Multithreaded Priority Queue.

GUI Programming: Introduction, Tkinter programming, Tkinter widgets.vSending email

Text Book:

1. Programming in python, Mark Summerfield, 2nd edition, Addison – Wesley publication

Reference Books:

1. Programming Python, 4th Edition - O'Reilly Media

MCA/ MCA (LE)
Semester-V
(ELECTIVE-2-A)
ASP.NET WITH C#

Unit-1

Introduction to .Net - .Net Framework Features & Architecture, CLR, Common Type System, MSIL, Assemblies and Class Libraries, . NET languages and Benefits of .NET Application C# and ASP.NET, difference between PHP and ASP.NET

Unit-2

C#: C -Sharp Language (C#): Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array and Strings, Object and Classes, Inheritance and Polymorphism, Operator Overloading, Interfaces, Delegates and Events. Type conversion.

Unit-3

Visual C#.NET fundamentals and Windows based software development: Overview of C#, Visual C#.NET .Net Development Environment, Introduction to .NET Controls: working with .Net Controls. Windows based software development, introduction to MDI Parent Form.

Unit-4

Web based software development: Introduction to Web servers, IIS configuration, ASP.NET Controls, ASP.NET Web Form Controls, accessing controls Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box, calendar etc.
Validation controls: RequiredFieldValidator, Range validator, RegularExpressionValidator, CompareValidator etc.

Unit-5

ADO.Net (Using C#.NET): Architecture of ADO.Net, .Net Data provider, Accessing Data using Command and Data Adapter, Data Set, Data Reader, Binding data in data grid view.

Introduction to XML: Accessing data from XML document.

Text Book:

1. Asp.net 3.5 black book (covers c# and vb 2008 codes) - dreamtech publication
2. The complete reference asp.net by mathew macdonald - tmh
3. Professional asp.net- wrox publication

Reference Book:

1. Kothari Nikhil and Datye Vandana, Developing ASP .NET Server Controls and Components, Tata McGraw Hill, 2003.
2. Esposito Dino, Applied XML Programming for Microsoft .NET, Tata McGraw Hill, 2003.

MCA/ MCA (LE)
Semester-V
(ELECTIVE-2-B)
ADVANCED JAVA PROGRAMMING

Unit-1

Introduction to JFC and Swing- Button class, JRadioButton class, JTextArea class, JComboBox class, JTable class, JColorChooser class, JProgressBar class, JSlider class, Digital Watch, Graphics in swing, Displaying image, Edit menu code for Notepad, OpenFileDialog Box, LayoutManagers, Java Reflection API, Serialization and Deserialization.

Unit -2

Networking and Multithreading - Socket Programming (Connection-oriented), URL class, Displaying data of a webpage by URLConnection class, InetAddress class, DatagramSocket and DatagramPacket . Life Cycle of a Thread, Synchronization with synchronized method, Deadlock Inter-thread communication .Introduction to RMI ,Steps involved in running the RMI

Unit -3

JDBC- Introduction, JDBC Drivers, DB Connectivity Steps, Store image, Retrieve image, Store file, Retrieve file, CallableStatement, Transaction Management, Batch Processing, RowSet Interface.

Unit -4

JavaServer Pages (JSP): Introduction, JSP Scriptlet tag, Implicit Objects, JSP directives, Exception Handling, Action Tags, MVC.

Unit -5

Servlet -Introduction, Life Cycle, Servlet with IDE, ServletRequest Interface, ServletConfig Interface, Attribute in Servlet, Session Tracking.

Text books:

1. J2EE, Complete Reference, Herbert Schildt.

Reference Books:

1. Advanced Programming in Java 2, K. Somasundaram, Jaico publication,

MCA/ MCA (LE)
Semester-V
(ELECTIVE-2-C)
SYSTEM AND NETWORK PROGRAMMING

UNIT 1

Linker and Loader: Introduction, Relocation of Linking Concept, Design of a Linker, SelfRelocating Programs, Linking in MSDOS, Linking of Overlay Structured Programs, Dynamic Linking, Loaders, Different Loading Schemes, Sequential and Direct Loaders, Compile-and-Go Loaders, General Loader Schemes, Absolute Loaders, Relocating Loaders, Practical Relocating Loaders, Linking Loaders, Relocating Linking Loaders, Linkers v/s Loaders

UNIT 2

Scanning and Parsing: Programming Language Grammars, Classification of Grammar, Ambiguity in Grammatical Specification, Scanning, Parsing, Top Down Parsing, Bottom up Parsing, Language Processor Development Tools, LEX, YACC

UNIT 3

Macro and Macro Processors: Introduction, Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design Of a Macro Preprocessor, Design of a Macro Assembler, Functions of a Macro Processor, Basic Tasks of a Macro Processor, Design Issues of Macro Processors, Features, Macro Processor Design Options, Two-Pass Macro Processors, One-Pass Macro Processors

UNIT 4

Interprocess Communication: Introduction - Message passing (SVR4)- pipes - FIFO - message queues - Synchronization (SVR4) - Mutexes - condition variables - read - write locks - file locking - record locking - semaphores - Shared memory(SVR4).

Sockets: Introduction - transport layer - socket introduction - TCP sockets - UDP sockets - raw sockets - Socket options - I/O multiplexing - Name and address conversions.

UNIT 5

APPLICATIONS: Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat.

Text Books

1. W.Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 1999.(Unit 1,2 & 3)
2. W. Stevens, Bill Fenner, Andrew Rudoff, "Unix Network Programming", Volume 1,The Sockets Networking API,3rd Edition, Pearson education, Nov 2003.(unit 4 & 5)

Reference Books

1. Meeta Gandhi,Tilak Shetty and Rajiv Shah - The 'C' Odyssey Unix -The open Boundless C ,1st Edition ,BPB Publications 1992.

LIST OF PRACTICAL:

1. Implement following commands of DOS in C:
 - a. mkdir
 - b. dir
 - c. copy

2. Write a simple 'C' program and generate the following codes for that.
 - a. Preprocessed code
 - b. Assembly Code
 - c. Object Code
 - d. Executable Code

3. Use macro features of C language and demonstrate the following types macro with example:
 - a. Simple Macro
 - b. Macro with arguments
4. Write a program to create a process and display its process identification number and parent process identification number.
5. Write a program to print process identification numbers of parent process and ten of its child processes.
6. Write a program to implement file server using Pipes.
7. Write a program to implement file server using FIFO (with related processes).
8. Write a program to implement file server using FIFO (with unrelated processes).
9. Implement TCP echo server (iterative) and client.
10. (a) Implement TCP echo server and client (concurrent) and also catch SIGCHLD signal to prevent zombies.
(b) Modify TCP client of part (a) such that it establishes five connections with server and server should use waitpid () to take termination status of its childs.
11. Implement TCP daytime server (iterative & concurrent) and client.
12. Implement FTP server and FTP client.
13. Implement TCP client and server in which you pass binary structures between them.
14. Implement UDP echo server and client.
15. Implement UDP daytime server and client.

MCA/ MCA (LE)
Semester-V
(ELECTIVE-2-D)
MATLAB PROGRAMMING

UNIT 1

Introduction to Programming: Components of a computer, Working with numbers, Machine code, Software hierarchy

Programming Environment: MATLAB Windows, A First Program, Expressions, Constants, Variables and assignment statement, Arrays

UNIT 2

Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save

Procedures and Functions: Arguments and return values, M-files, Formatted console input-output, String handling

UNIT 3

Control Statements: Conditional statements: If, Else, Elseif, Repetition statements: While, For, Planning a large program, working with stubs

Manipulating Text: Writing to a text file, Reading from a text file, Randomising and sorting a list, Searching a list

UNIT 4

GUI Interface: Attaching buttons to actions, Getting Input, Setting Output

Discrete Linear Systems: Characterisation of linear systems, Finite Impulse Response filters, Infinite Impulse Response filters, Frequency response

UNIT 5

Spectral Analysis: Filterbank analysis, Fourier analysis, Spectrograms, Filterbank synthesis

Speech Signal Analysis: Fundamental frequency estimation – frequency domain, Fundamental frequency estimation – time domain, Formant frequency estimation

Text Book:

1. Matlab for Beginners: A Gentle Approach, Peter Kattna, 2008, Petra Books publications

Reference Books:

1. MATLAB: An Introduction with Applications, by Amos Gilat, 2nd edition, Wiley, 2004, ISBN-13 978-0471694205.

LIST OF PRACTICAL:

1. Write a program to assign the following expressions to a variable A and then to print out the value of A.
 - a. $(3+4)/(5+6)$
 - b. $2\pi^2$
 - c. $\sqrt{2}$
 - d. $(0.0000123 + 5.67 \times 10^{-3}) \times 0.4567 \times 10^{-4}$
2. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.
3. Set up a vector called N with five elements having the values: 1, 2, 3, 4, 5. Using N, create assignment statements for a vector X which will result in X having these values:
 - a. 2, 4, 6, 8, 10
 - b. $1/2, 1, 3/2, 2, 5/2$
 - c. $1, 1/2, 1/3, 1/4, 1/5$
 - d. $1, 1/4, 1/9, 1/16, 1/25$
4. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2, 0.5, 1.3]; while the numbers of each product are [3, 2, 1, 5]. Use MATLAB to calculate the total bill.
5. The sortrows(x) function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order.

6. The identity matrix is a square matrix that has ones on the diagonal and zeros elsewhere. You can generate one with the `eye()` function in MATLAB. Use MATLAB to find a matrix B, such that when multiplied by matrix $A = \begin{bmatrix} 1 & 2 \\ -1 & 0 \end{bmatrix}$ the identity matrix $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is generated. That is $A*B=I$.
7. Create an array of N numbers. Now find a single MATLAB statement that picks out from that array the 1,4,9,16,...,√Nth entries, i.e. those numbers which have indices that are square numbers.
8. Draw a graph that joins the points (0,1), (4,3), (2,0) and (5,-2).
9. The seeds on a sunflower are distributed according to the formula below. Plot a small circle at each of the first 1000 co-ordinates :

$$r_n = \sqrt{n}$$

$$\theta_n = \frac{137.51}{180} \pi n$$

10. Calculate 10 approximate points from the function $y=2x$ by using the formulae:

- i. $x_n = n$
- ii. $y_n = 2n + \text{rand} - 0.5$

Fit a line of best fit to these points using the function `polyfit()` with `degree=1`, and generate co-ordinates from the line of best fit using `polyval()`. Use the on-line help to find out how to use these functions. Plot the raw data and the line of best fit.

11. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 11025Hz. Save the sound to a file called "ex35.wav". Plot the first 100 samples.
12. Calculate and replay a 2 second chirp. That is, a sinusoid that steadily increases in frequency with time, from say 250Hz at the start to 1000Hz at the end.
13. Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be $1/n$. Display a graph of one cycle of the result superimposed on the individual harmonics.
14. Write a function called `FtoC` (`ftoc.m`) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with:
 - i. `FtoC(96)`
 - ii. `lookfor Fahrenheit`
 - iii. `help FtoC`
15. Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:
 - i. Enter string 1: Mark
 - ii. Enter string 2: Huckvale
 - iii. Mark Huckvale
 - iv. *****
 - v. elavkcuH kraM

MCA/ MCA (LE)
Semester-V
(ELECTIVE-2-E)
ANDROID PROGRAMMING

UNIT 1:

JAVA Concepts: OOPs Concepts Inheritance in detail, Exception handling, Packages & interfaces, JVM & .jar file extension, Multi-threading (Thread class & Runnable Interface).

UNIT2:

Introduction to Android: What is Android?, Setting up development environment , Dalvik Virtual Machine & .apk file extension, Installing the SDK Creating Android Emulator, Installing Eclipse, Installing Android Development Tools, Choosing which Android version to use.

UNIT3:

Application development Fundamentals: Basic Building blocks - Activities, Services, Broadcast Receivers & Content providers, AndroidManifest.xml , uses-permission & uses-sdk ,Resources & R.java, Assets ,Layouts & Drawable Resources . Activities and Activity lifecycle, First sample Application.

UNIT4:

Basic UI design: Form widgets , Text Fields, Button controls, Toggle buttons, Alert dialogToast, CheckBox, AlertDialog, Spinner, AutoComplete, TextView, RatingBar, DatePicker, TimePicker etc. Android Menu:Option Menu, Context,Menu,Popup Menu.

UNIT5:

Content Providers : SQLite Programming , SQLiteOpenHelper , SQLiteDatabase,CRUD using SQLite.

Text Books:

1. Android Programming: Pushing the Limits, Erik Hellman, Wiley publications.

Recommended Books:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

LIST OF PRACTICALS:

1. Create –Hello World application. That will display –Hello World in the middle of the screen in the emulator. Also display –Hello World in the middle of the screen in the Android Phone.
2. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
3. Create a menu with 5 options and selected option should appear in text box.
4. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
5. Create an application with three option buttons, on selecting a button color of the screen will change.
6. Create and Login application. On successful login, pop up the message.
7. Create an application to Create, Insert, update, Delete and retrieve operation on the database.
8. Create an application for camera with flash and other options.
9. Create an application for music player.
10. Create an application for video player.

MCA/ MCA (LE)

Semester-VI

MAJOR PROJECT

Mandatory Requirements for acceptance of the Project

1. Normalized Database Tables: Minimum 5
2. Forms: Minimum 10
3. Reports: As per forms (accordingly)
4. Activity Diagram, Sequence Diagram, Collaboration Diagram, ER Diagram, State-Transition Diagram, Use-Case Diagram, etc. for all forms in the project.
5. All the documentation as per University Syllabus.
6. The project file should follow the guidelines given by University (draft/specimen copy given below).

General Instruction Regarding Preparation of Project Report For MCA SEM-VI

COPIES

Hard-bound copies with CD (containing softcopy of project file and software project with all its supporting software). (Blue Rexine with Silver Embossing as per format displayed herewith)

One original (for submission) and clean Xerox Copies (according to number of students in a group)

SELECTION OF PROJECT:

Each student will be doing the project independently. There will no group of the student doing a single project at a time. But, it's possible that a group of student is doing different modules of the same project. In such cases, the student is required to do 3-5 modules of the large project. The project could be an industry project where the student can go to the industry and work over there or the student can do the in-house project at study centre of university. The selection of the project can be done in consultation with the faculty of the study centre.

GUIDE FOR THE PROJECT:

Each student will be working under a Project Guide for the project to be done. The guide could be the person under whose supervision the student is doing the project in the industry or can be the faculty at the Study Centre under whose guidance the student is doing the project at the Study Centre. Guide should have five years of working experience and Master's Degree in relevant field.

Cover Page - Attractive and appealing cover page containing the Project Title, program details, Student & Guide details, date of submission etc.

Letter of Authentication - To be submitted by students declaring that the Project Report is the original work of student and no reward had been attained for same project ever before. Students are advised not to **COPY** the project report from other students.

Authorization from Organization / Study Centre where such Project have been implemented - With certificate showing the student name, project name with future recommendations of organization if any.

Certificate from Project Guide - Certificate from the Project Guide certifying the project work done under his/her guidance alongwith course, student, project details complete in all respects.

Guide's Bio-Data - Detailed Bio-Data of Guide must accompany the Project Report. The Bio-Data should be properly typed and duly signed by the Project Guide. Bio-Data should contain detailed academic qualification and experience of Guide.