

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 2013-16 till revised)



AKS UNIVERSITY, SATNA

Study and Evaluation Scheme

**** The University Authorities reserve all the rights to make any additions/ deletions or changes/
modifications to this syllabus as deemed necessary.**

AKS University, Satna
Sherganj, Panna Road, Satna (MP) 485001

**Study & Evaluation Scheme
of
Master of Computer Applications
SUMMARY**

Programme :	MCA (3 yrs) & MCA (LE) (2 yrs)		
Duration :	Three year full time (Six Semesters) Two Year (Four Semester) for LE		
Medium :	English		
Minimum Required Attendance :	75 %		
Maximum Credits:	159 (for 3 Yrs) & 118 (for LE)		
Evaluation Assessment :	Internal	External	Total
	50	100	150

Internal Evaluation (Theory/ Practical Papers)

	Sessional-I	Sessional-II	Continuous Assessment & attendance
	10	10	10+20= 30
Duration of Examination :	External	Internal	
	3 hrs.	2 hrs	

To qualify the course a student is required to secure a minimum of 36% marks in aggregate including the semester end examination, internal assessment evaluation (Both theory & Practical Papers)

A candidate who secures less than 36% or Grade 'D' of marks in a Subject/Paper(s) shall be deemed to have failed in that Subject/Paper(s). In case a student has secured less than 36% or Grade 'R' in Subject/Paper(s), he/she shall be deemed to re-appear (ATKT Examination) in Subject/Paper(s) to achieve the required percentage (Min. 36%) or grade (Min. D) in the Subject/Paper(s).

Question Paper Structure

1. The question paper shall consist of 26 questions in three Sections. Out of which Section-A shall be of Objective type 10 questions and will be compulsory. (weightage 2 marks each).
2. Section-B shall contain 10 Short answer type questions and students shall have to answer any eight (weightage 5marks each).
3. Out of the remaining six question s are long answer type questions, student shall be required to attempt any four questions. The weightage of Questions shall be 10 marks each.

Faculty of Computer Application & Information Technology and Science

Department of Computer Application and IT

MCA

I Semester

TEACHING AND EXAMINATION SCHEME

S. NO.	Subject Code	SUBJECT/PAPER	L	T	P	CREDIT
1	44CA101	Basic Application of Computers	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
6	44SD106	SSD-Functional English-I	3	0	0	3
1	44CA151	Basic Application of Computers LAB	0	0	3	2
2	44CA152	Programming in C Language LAB	0	0	3	2
		TOTAL CREDIT	18	4	6	26

Faculty of Computer Application & Information Technology and Science

Department of Computer Application and IT

MCA

II Semester

TEACHING AND EXAMINATION SCHEME

S. NO.	Subject Code	SUBJECT/PAPER	L	T	P	CREDIT
1	44CA201	Office Automation Tools	3	1	0	4
2	44CA202	Advance Programming in C Language	3	1	0	4
3	44CA203	Computer Organization and Architecture	3	1	0	4
4	44MS204	Discrete Mathematical Structure	3	1	0	4
5	44CA205	Cyber Security and Laws	3	1	0	4
6	44SD206	SSD-Functional English-II	3	0	0	3
1	44CA251	Office Automation Tools LAB	0	0	3	2
2	44CA252	Advance Programming in C Language LAB	0	0	3	2
		TOTAL CREDIT	18	5	6	27

Faculty of Computer Application & Information Technology and Science

Department of Computer Application and IT

MCA/ MCA (LE)

III Semester

TEACHING AND EXAMINATION SCHEME

S. NO.	Subject Code	SUBJECT/PAPER	L	T	P	CREDIT
1	44CA301	Advanced Computer Network	3	1	0	4
2	44CA302	Object Oriented Programming in C++	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	44SD306	Soft Skill Development	0	0	2	1
7	45MS301	Discrete Mathematical Structure (for MCA-LE)	3	1	0	4
1	44CA351	Object Oriented Programming in C++ LAB	0	0	3	2
2	44CA352	Advanced Computer Network LAB	0	0	2	1
3	44CA353	Data Structure Using C LAB	0	0	3	2
		TOTAL CREDIT	18	6	10	26/ 30

Faculty of Computer Application & Information Technology and Science

Department of Computer Application and IT

MCA/ MCA (LE)

IV Semester

TEACHING AND EXAMINATION SCHEME

S. NO.	Subject Code	SUBJECT/PAPER	L	T	P	CREDIT
1	44CA401	Analysis and Design of Algorithm	3	1	0	4
2	44CA402	Web Technology	3	1	0	4
3	44CA403	Applied Mathematics (Algebra & Statistics)	3	1	0	4
4	44CA404	Database Management System with Oracle	3	1	0	4
5	Elective-1 (Choose any one)		3	1	0	4
	44CA405-A	Artificial Intelligence				
	44CA405-B	Cryptography and Network Security				
7	45CA401	Advanced Operating System (For MCA-LE)	3	1	0	4
1	44CA451	Database Management System with Oracle LAB	0	0	2	1
2	44CA452	Web Technology LAB	0	0	3	2
3	44CA453	Project LAB	0	0	3	2
		TOTAL CREDIT	18	6	8	25/ 29

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MCA/ MCA (LE)

V Semester

TEACHING AND EXAMINATION SCHEME

S. NO.	Subject Code	SUBJECT/PAPER	L	T	P	CREDIT
1	44CA501	Computer Graphics	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	44CA504	Financial accounting with Tally	3	1	0	4
	Elective-2 (Choose any One)		3	1	0	4
5	44CA505-A	Advance Java Programming				
	44CA505-B	ASP.NET with C#				
6	45CA501	Computer Organization and Architecture	3	1	0	4
1	44CA551	Linux and shell programming LAB	0	0	2	1
2	44CA552	Financial accounting with Tally LAB	0	0	2	1
3	44CA553-A/B	Elective-2 LAB	0	0	3	2
4	44CA554	Minor Project LAB	0	0	3	2
		TOTAL CREDIT	18	6	10	26/ 30

Faculty of Computer Application & Information Technology and Science

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MCA/ MCA (LE)

VI Semester

TEACHING AND EXAMINATION SCHEME

S.NO.	Subject Code	SUBJECT/PAPER	L	T	P	CREDIT
1	44CA601	Compiler Design	3	1	0	4
2	44CA602	Python Programming	3	1	0	4
3	44CA603	Cloud Computing	3	1	0	4
4	44EN604	Entrepreneurship	3	0	0	3
1	44CA651	Major Project LAB	0	0	24	12
2	44CA652	Python Programming	0	0	3	2
		TOTAL CREDIT	12	3	12	29

MCA

Semester: I

BASIC COMPUTER APPLICATION

Objective: This subject will give the student the basic knowledge of computer like its terminology, overview of the operating system.

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. 7

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

MCA

Semester: I

Programming in C Language

Objective-*This course provides students with a comprehensive study of the C programming language. which provide programmers with the means of writing efficient, maintainable, and portable code. The lectures are supplemented with non-trivial lab exercises.*

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

MCA

Semester: I

DIGITAL ELECTRONICS

Objective: *This subject covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, and other related topics. Upon completion, students should be able to construct, analyze, verify and troubleshoot digital circuits using appropriate techniques*

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, demurrage'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 2,3,4,5 variables, 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. R.K Gaur, Digital Electronics and microprocessor

Reference book

1. R. P. Jain, Digital Electronics

MCA
Semester: I
ADVANCED OPERATING SYSTEM

OBJECTIVE: *This subject deals with the important aspects of a computer operating system, including processes, scheduling algorithms, and memory management. Concepts such as deadlocks, memory management, and file management are detailed.*

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

SPIRITUAL STUDIES (HINDUISM)
SRIMADBHAGWADGITA
Compulsory for All Programme/ Courses
श्रीमद्भगवद्गीता

UNIT-I

अध्याय—एक

अर्जुन की मोहग्रस्तता,

अध्याय—दो

अर्जुन का नैराश्य, शरीर और आत्मा का विश्लेषण, कर्तव्यपालन, निष्काम कर्मयोग, स्थितप्रज्ञ एवं तापत्रय

अध्याय—तीन

कर्मयोग, षट्ठिकार

UNIT-II

अध्याय—चार

गीता का इतिहास, भगवान के प्राकट्य का कारण एवं उनकी सर्वज्ञता

अध्याय—पांच

ईश्वरभावनाभावित कर्म

अध्याय—छः

ध्यान योग या सांख्य योग, सिद्धि या समाधियोग

अध्याय—सात

परा और अपरा शक्ति, पुण्यात्मा मनुष्य के लक्षण

UNIT-III

अध्याय—आठ

ब्रह्मा, आत्मा, अधिभूत, अधिदैव, अधियक्ष, मुक्तिलाभ की विधि

अध्याय—नौ

परमगुहाज्ञान

अध्याय—दस

श्रीभगवान का ऐश्वर्य

UNIT-IV

अध्याय—ग्यारह

श्रीभगवान का विराटस्वरूप

अध्याय—बारह

भक्तियोग का वर्णन, अव्यक्त की उपासना में क्लेश, शुद्ध भक्त के लक्षण

अध्याय—तेरह

क्षेत्र, क्षेत्रज्ञ एवं कर्मक्षेत्र की परिभाषा, ज्ञान, ज्ञेय, प्रकृति एवं परमात्मा, चेतना

अध्याय—चौदह

त्रिगुण स्वरूप

अध्याय—पंद्रह

परम पुरुष का स्वरूप, जीव का स्वरूप

UNIT-V

अध्याय—सोलह

दैवीय स्वभाव, आसुरी स्वभाव

अध्याय—सत्रह

श्रद्धा के तीन प्रकार, भोजन के प्रकार, यज्ञ के प्रकार, तप के प्रकार, दान के प्रकार, ॐ कार का प्रतिपादन, सत्, असत् का प्रतिपादन

अध्याय—अठारह

सन्यास 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

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, भक्तिदांत बुक ट्रस्ट, मुंबई, 1996।
5. Srimadbhagawadgita-English commentary by Jaydayal Goyandaka, Gita Press, Gorakhpur, 1997.

SULLABUS

SPIRITUAL STUDIES (ISLAM) Compulsory for All Programme/ Courses

UNIT-I

इस्लाम धर्म:— 6वीं शताब्दी में अरब की (राजनैतिक, धार्मिक, सामाजिक, आर्थिक परिस्थितियां व कबीलाई व्यवस्था)

मोहम्मद साहब का जीवन परिचय, संघर्ष व शिक्षाएं, इस्लाम का प्रारम्भ, इस्लाम क्या है और क्या सिखाता है, ईमान—ईमाने मोजम्मल, ईमाने मोफस्सल।

UNIT-II

इस्लाम धर्म की आधारभूत बातें:—

तोहीद, कल्मा—कल्मा—ऐ—शहादत, कल्मा—ऐ—तैय्यबा, नमाज, रोजा, जकात और, हज का विस्तारपूर्वक अध्ययन

UNIT-III

खोदा—तआला की किताबें (आसमानी किताबें):—

“वही” की परिभाषा, तौरत, जुबूर, इंजील का परिचय, पवित्र कुरान का संकलन, पवित्र कुरान का महत्व, कुरान की मुख्य आयतें, पवित्र कुरान और हाफिजा

UNIT-IV

पवित्र हदीसों और सुन्नतें:—

हदीस और सुन्नत क्या है, हदीस और सुन्नत का महत्व, कुछ प्रमुख सुन्नतें और हदीसों का अध्ययन, सोकर उठने की सुन्नतें, लेबास की सुन्नतें, बीमारी और अयादत की सुन्नतें, सफर की सुन्नतें

UNIT-V

इस्लाम धर्म की अन्य प्रमुख बातें:—

मलाऐका या फरिशते (देवदूत), खुदा के रसूल, खुदा के पैगम्बर, नबी और रसूल में अन्तर, कयामत, सहाबा, खलीफा, मोजिजा और करामात, एबादत, गुनाह (कुफ्र और शिर्फ), माता—पिता, रिश्तेदार व पड़ोसी के अधिकार, इस्लाम में औरत के अधिकार, इस्लाम में सब्र और शुक्र, इस्लाम में समानता और भाईचारा

ADDITIONAL KNOWLEDGE:-

IN THE LIGHT OF ‘QURAN’ AND ‘HADEES’, TEN POINTS WILL BE DELIVERED TO THE STUDENTS DAILY, IN A SECULAR COUNTRY THE STUDENTS SHOULD KNOW THE PHILOSOPHY OF OTHER RELIGION ALSO SUCH AS “JAINISM”, “BUDHISM” AND “SANATAN DHARMA”.

SSD - FUNCTIONAL ENGLISH-1

I Semester

MBA/MCA/M PHARM/M.Sc.BT/MSW

Unit-I

May and can for permission and possibility
Could for permission in the past
May/Might for possibility.
Can and be able for ability.
Ought, should, must, have to, need for obligation.
Must, have, will and should for deduction and assumption.
The auxiliaries dare and used
Command, requests, invitations, advice, suggestions

Unit-II

The Present Tense:
Present Continuous, Simple present (Form and use)
The past and perfect tenses:
Simple past, The past continuous, The present perfect, The present perfect continuous, The past perfect, The past perfect continuous. (Form and use)

Unit-III

The Future: Future simple, the future continuous (Form and use)
The sequence of tenses, The conditional sentences

Unit-IV

Articles: Definite, Indefinite and Zero, The Passive voice; Active tenses and their passive equivalents, use of passive

Unit-V

The infinitive, The Gerund, The Participle, Preposition.

NOTE: Coverage of 1220 Regular (600) and Irregular Verbs (620) with their meaning and uses.

(Teachers are required to Introduce 25 verbs from the given verb list in every lecture)

MCA
Semester: II
OFFICE AUTOMATION

***Objective:** This subject will give the student the basic knowledge of computer like its terminology, overview of the operating system.*

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. 7

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

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.

UNIT V

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

MCA
Semester: II
Advanced Programming in C Language

Unit – 1

C-basic: C character set, Identifiers and keyword data types, constants, variables and arrays, declarations, expressions statements, symbolic constants, compound statements, certainty operations, 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, got statement.

Unit – 2

Arrays :- Arrays, declaring array, initializing array, One Dimensional array, 2 Dimensional array, multi-dimensional array. C-Functions: - Function declaration, definition & scope, recursion, call by value, call by reference. Storage class :- Automatic external (global) static & registers.

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

Unit – 3

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

DMA – Intro to Dynamic memory allocation, colic (), Malay (), really (), free (), allot.

Unit – 4

File handling – Intro to file handling, text us Binary file. Various file handling functions get (), put (), get, put, gets, puts, forint, scan, frets, puts, field, write, Random access file, freek, ftell and rewind.

Graphics programming – Intergraph, Drawing objects in graphics – live, rectangles ellipse, circle, polygon, filling hours, text formatting functions.

Unit – 5

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

Introduction to Objective C

Reference Books:

1. Kernighan, Ritchie, “The C Programming Language”, Prentice Hall of India
2. Carlo Ghezzi, Mehdi Jazayeri, “Programming Language Concepts”, John Wiley and Sons
3. E. Balagurusamy, “Programming in ANSIC C”, Tata McGraw Hill, 2002
4. YashavantKanetkar, “Let Us C” – Seventh Edition, BPB Publications, 2007

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.

Additional Reading/Working Topics/Indicative lists: Study of latest microprocessors and collect information about AMD processors.

Text books:

Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization", McGraw-Hill, 2002.

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

Discrete Mathematical Structures

Unit-1

Sets, Relations & Functions: Property of binary relations, equivalence, compatibility, partial ordering relations, functions, inverse functions, composition of functions, recursive functions. hashing functions, characteristic functions, floor functions, ceiling functions, subjective control, injunctive (one-to-one) Inverse functions Infinite sets and compatibility Properties of countable sets Non-denumerable sets.

Unit-2

Mathematical Logic: Logic operators, Truth tables, Propositions (Statements) Logical connectivity's, Compound statements form, truth tables, tautology, implications and equivalence of statements forms logical identities Normal forms: disjunctive normal form and simplification Theory of inference and deduction, mathematical calculus, predicate calculus, predicates and quantifiers.

Unit-3

Groups & Subgroups: Group axioms, Monoids , semi groups, Isomorphism, homomorphism , automorphism. Lattices & Boolean Algebra: Truth values and truth tables, the algebra of propositional functions, Boolean algebra of truth values. Group codes: Weight and Hamming distance, minimum distance of code , generation of codes using parity checks – even parity, odd parity , parity check matrix – Hamming code, for detection and correction errors , formation of encoding function

Unit-4

Lattices & Boolean Algebra: Truth values and truth tables, the algebra of propositional functions, Boolean algebra of truth values.

Combinatorics& Recurrence Relations: Permutation, Combination, Principle of Inclusion and Exclusion, Recurrence Relations, Generating Functions

Unit-5

Graph Theory: Basic Concepts of Graphs and Trees, Basic terminology, simple and weighted graph Adjacency and Incidence Matrices, complete graph, regular graph, bipartite graph connected graphs, paths-simple, elementary circuit, Transitive Closure, Shortest Path, Eulerian and Hamiltonian graphs, Concept of Tree, Spanning Tree Applications of Graph Theoretic Concepts to Computer Science.

Reference Books:

1. J.P. Trembley and R.P.Manohar, Discrete Mathematical Structures with Applications Computer Science, McGraw Hill.
2. Dornhoff and Hohn, Applied Modern Algebra, McMillan.
3. N. Deo, Graph Theory with Applications to Engineering and Computer Science, PHI.
4. R. Johnsonbaugh, Discrete Mathematics, Pearson Education, 2001.
5. R. P. Grimaldi, Discrete and Combinatorial Mathematics, Pearson Education, 1999.
6. C.L. Liu, Elements of Discrete Mathematics, McGraw-Hill.

MCA

Semester: II CYBER SECURITY AND LAWS

Objectives :

The aim of this course is to provide attendees with a thorough understanding of the issues associated with the design, provision and management of security services for modern communication and information systems. Students will learn the different aspects of information and network security and you will be able to speak about a multitude of security attacks and the defensive strategies used to combat them.

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

TextBooks:

1. Cyber laws and syber security in developing and emerging economies, ZeinabKarake-Shalhoub, Luna Al Qasimi
2. Computer Security, Dictergouman, 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

SSD - FUNCTIONAL ENGLISH-1

II Semester

MBA/MCA/M PHARM/M.Sc.BT/MSW

Unit-1

Conceptual Sessions: Subject verb agreement, Conjunction: Co-ordinating and Subordinating, Sentences-Simple, Compound and Complex

Activity: Speaking Activities Based on Themes (College/University, Beauty and Physical attractiveness, Food and eating, Dreams, Entertainment)

Assignment : Progress Test-1

Unit-2

Conceptual Sessions: Special Expressions: Asking for Information/directions/someone to repeat/expressing uncertainty, Interrupting politely, apologizing, Giving instructions, Sequencing actions, Making suggestions, Accepting an invitation, Expressing a preference, Making recommendations, Giving permission, Agreeing and Disagreeing, Common Errors in English,.

Activity: Speaking Activities Based on Themes (Vacation, Behaviour, Facebook, Computers)

Assignment : Progress Test-2

Unit-3

Conceptual Sessions: Presentation Skills: Meaning, Need for Oral presentation, Planning of presentation, use and types of Visual aids, Kinesics: Gesture, posture, facial expressions, Eye contact, Proxemics, voice and tone, Appearance and accessories.

Activity: Speaking Activities Based on Themes (Childhood, celebrities, Films in your own language)

Assignment : Progress Test-3

Unit-4

Conceptual Sessions: Reading comprehension, Vocabulary: Antonyms, Synonyms, Phrasal verbs, British English vs. American English, Business vocabs, Dictionary of formal and Informal English, List of personality Adjectives.

Activity: Story creation and Picture description.

Assignment : Progress test-4

Unit-5

Conceptual Sessions: Business letter writing: Parts and layout, Enquiry letter, Order letter, Complaint letter, Job application and leave application

Activity: Dialogue writing

Assignment : Progress test-5

MCA/ MCA (LE)

Semester: III

Object Oriented Programming in C++

Objective: To familiarize the student with the universal concepts of computer programming. To present the syntax and semantics of the “C++” language as well as basic data types offered by the language. To discuss the principles of the object-oriented model and its implementation in the “C++” language

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.

C++ Project-

- oving 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's:

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:
- To create the vector
 - To modify the value of a given element
 - To multiply by a scalar value
 - To add a vector to another
 - 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 no pay 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.

Text books:

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

Reference books:

1. Object Oriented Programming in C++, Robert Lafore
2. UML in 21 Days, TechMedia

MCA/ MCA (LE)

Semester: III

Theory of Computation

Objective: The goal of this course is to provide students with an understanding of basic concepts in the Theory of computation. The course will cover various models of computation, including Turing machines, pushdown automata, and deterministic and nondeterministic finite automata. The relationships between these models and various classes of languages will be explored. These topics will be used as a basis for exploring computability, complexity, and more advanced areas of theory.

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

Advance Computer Network

Objective: This module aims to provide a broad coverage of some new advanced topics in the field of computer networks .

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 Convertor.

Advanced Topics: IPv6

Textbooks:

1. Data Communications and Networking, Behrouz A. Forouzan, 3rd Edition, Tata Mcgraw- Hill.
2. Computer Networks: A. S. Tannenbum, 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

Data Structure and Algorithms

Objective: Be familiar with basic techniques of algorithm analysis, writing recursive methods and master analyzing problems and writing program solutions to problems.

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

Advance Topics: Persistent Data Structures, Augmenting Data Structures, Memory Management and Garbage Collection

List of practicals:

- STACKS DATA STRUCTURE PROGRAMS
- QUEUES DATA STRUCTURES PROGRAMS
- LINKED LISTS DATA STRUCTURE PROGRAMS
- TREES DATA STRUCTURES PROGRAMS
- GRAPHS DATA STRUCTURE PROGRAMS
- SEARCH PROGRAMS
- SORTING PROGRAMS

TextBooks:

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

MCA/ MCA (LE)

Semester: III

Advanced Software Engineering

Objective: It aims to develop a broad understanding of the discipline of software engineering. It seeks to complement a familiarity with analysis and design with knowledge of the full range of techniques and processes associated with the development of complex software intensive systems. It aims to set these in an appropriate engineering and management context.

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 and finite state machine (FSM) models.

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, Software configuration management.

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, Case Study of CASE tools.

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.

Advance Topics:

Cleanroom software engineering, Challenges of software engineering for distributed and mobile systems.

Text Books:

1. “An Integrated Approach to Software Engineering”, Pankaj Jalote, IIIrd Edition, Narosa Publishing House.
1. “Software Engineering: Principles and Practices”, Waman S. Jawadekar, Tata McGraw-Hill.
3. “Software Engineering: A Practitioner’s approach”, Roger S. Pressman, McGraw-Hill.
4. “Software Engineering:”, Ian Somerville, Pearson Education.
5. “Fundamentals of Software Engineering”, Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, PHI.
6. S. L. Pfleeger, Software Engineering: Theory and Practice, Pearson Education.

MCA (LE)

Semester: III

Discrete mathematics Structure

Objective: The goal of this course is to introduce students to ideas and techniques from discrete mathematics that are widely used in science and engineering. This course teaches the students techniques in how to think logically and mathematically and apply these techniques in solving problems.

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.

Advance Topics: Lagrange's Theorem and Euler's Theorem

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

SSD- (Soft Skills Development)

3rd Semester

2 years Program (MBA/MCA/MSW/M.Sc (BT)/M.Pharma)

Soft Skills Competency: Soft skills are essential skills in the workplace. Students with excellent soft skills can fit into most environments because they are adaptable, flexible, committed and persevering, and display the right attitude. Such qualities cut across all disciplines. In order to perform well and advance in one's career, one needs to have high levels of soft skills in dealing with people. In short, technical skills need to be complemented with soft skills.

Learning Outcome: On completion of the course (SSD), the student should be able:

- Understand the Importance of various skills involved in developing enriching Interpersonal relationship.
- Be more aware of his/her own self- Confidence and values.
- Learn how to go about being a good team player and form an effective team.
- Understand the skills tested and participate effectively in Group discussion.
- Learn the basics of how to make an effective Presentation and have numerous practice Presentation in small groups and larger audiences.

Unit-1

Conceptual Sessions: Soft skills – a general overview, Industry Expectations, SWOT & STAR, Self Discovery, Leap to success- 7 Orientations,

Activity: Castle Plan.

Assignment : Sentence fluency assignment

Unit-2

Conceptual Sessions: Telephone etiquettes- Preparing for business calls/Making business calls/Telephonic phrases, Dining etiquettes, Email etiquettes, Corporate grooming and dressing.

Activity: Role play in different scenarios/ Socialization and networking.

Assignment : Progress test on general etiquettes.

Unit-3

Conceptual Sessions: Organizing meetings, Time Management, Team building and leadership, Resume writing Concept and Practice, Reading Comprehension.

Activity: Lost at Sea.

Assignment : Reading Comprehension Assignment.

Unit-4

Conceptual Sessions: Group discussion: Introduction and definition of a GD, Purpose of a GD, Types and strategies in a GD, Do's and Don'ts in GD, Speak to Impress (Presentation skill), Personal Interview, Frequently asked Questions (FAQ'S), Interview flow.

Activity: GD Practise and Presentation on Company profile.

Assignment : Communication assignment- GD.

Semester: IV
Analysis and Design of Algorithms

OBJECTIVE: This course is to teach the students the basics of algorithm and the different techniques to solve problems.

Unit-I : Introduction to Algorithms

Definition, Time and Space complexity, Asymptotic notation: Big Oh, Omega and Theta, Worst, Average and Best case analysis, Recurrence relation: Master method, Substitution method, Recursive-tree method, Analysis of algorithm, Design of Algorithm, Types of algorithm strategies.

Unit-II

Brute-force approach: Insertion sort.

Divide and Conquer approach: Quick-sort, Matrix Multiplication using Strassen's method, Stability of Algorithms: In-place sorting, Count-sort, Radix-sort.

Unit-III

Dynamic Programming: Matrix-chain multiplication, Elements of dynamic programming, Longest common subsequence, Fibonacci Sequence.

Unit-IV

Greedy Algorithm: Huffman codes, Elements of greedy strategy, Sudoku puzzle.

Backtracking strategy: Travelling-Salesman problem, Knapsack problem, 8-Queens Problem, Branch-and-bound (DFS), Graph coloring.

Unit-V

Difference among all the algorithm strategies

String Matching: Naïve algorithm, KMP Algorithm, Finite-automaton based searching.

Complexity classes: P, NP, NP-hard, NP-complete.

Advance Topics: I/O Complexity computation

Text Books:

S.No.	Name of Book	Edition	Authors' Name	Publication
1	Introduction to Algorithms	3 rd	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	Prentice Hall Publications

Reference Books:

S.No.	Name of Book	Edition	Authors' Name	Publication
1	Fundamental of Computer Algorithms	2 nd	Ellis Horowitz, Sartaj Sahni, <u>Sanguthevar Rajasekaran</u>	W. H. Freeman Silicon Press

MCA/ MCA (LE)
Semester: IV
Web Technologies

OBJECTIVE: This course enables students to know about web development using html and scripting languages.

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.

Unit-II

Cascading Style Sheet- Introduction, Levels of CSS inline style sheet, External style sheet, classes, class and ID method, DIV and SPAN tags.

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 Database, Perform Database (Query).

Advance Topics: Object Oriented Programming with PHP- Introduction to OOPS, creating classes and objects, accessing Data through methods.

Text Books:

S.No.	Name of Book	Edition	Authors' Name	Publication
1	Web Technologies, Black Book, DreamTechPress	2010	Kogent Learning Solutions Inc	DreamTechPress

Reference Books:

S.No	Name of Book	Edition	Authors' Name	Publication
1	Beginning PHP5, Apache, and MySQL Web Development	2005	Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass	Wrox Publication
2	Beginning HTML, XHTML, CSS, and JavaScript	2010	Jon Duckett	Wiley Publishing, 2010

List of practical:**S.No Name 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) Algebra & Statistics

Objective: Linear Algebra and its Applications contribute new information or new insights to matrix theory and finite dimensional linear algebra in their algebraic, arithmetic, combinatorial, geometric, or numerical aspects. And The outcome of statistical inference may be an answer to the question "what should be done next?", where this might be a decision about making further experiments or surveys, or about drawing a conclusion before implementing some organizational or governmental policy.

Unit-1

Determinants: Introduction of determinant, Minor co-factors and properties of determinant, Factor theorem, Special types of determinants, Application of determinants, Solution of simultaneous Linear Equation by Determinants(Cramer's Rule).

Unit-2

Algebra of Matrices: Definition, Various types of matrices, Addition, Subtraction, Multiplication of matrices, Properties of matrix multiplication, Adjoint of Square matrix, Inverse of matrix, Rank of matrix, Normal form (Canonical form), Solution of simultaneous equation, Types of linear equation, Homogeneous equations, Cramer's rule, Cayley-Hamilton theorem.

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, KitabMahalIVth, 1960.

MCA/ MCA (LE)

Semester: IV

DATABASE MANAGEMENT SYSTEM with ORACLE

Objective: *To understand the different issues involved in the design and implementation of Database System, data manipulation language, to query update and manage a database and To develop an understanding of essential DBMS concepts such as database security, integrity, concurrency, distributed database*

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.

TextBooks:

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

Reference books:

1. Ivan Byross, Programming in PL/SQL,

MCA/ MCA (LE)

Semester: IV (Elective-1)

Artificial Intelligence

OBJECTIVE: A critical examination of the advancing intellectual developments in artificial intelligence and evaluation of their salient philosophical and psychological implications.

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 word, component of planning systems, goal stack planning, non-linear planning, Symbolic centralized VS reactive distributed, partial order planning algorithm.

Weak Slot and Filter Structure;- Semantic nets and frames.

Strong slot and Filler structure;- conceptual dependency scripts

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.

Reference Books:

S.No	Name of Book	Edition	Authors’ Name	Publication
1	<i>Artificial Intelligence: A Modern Approach</i>	3 rd edition	<u>Stuart J. Russell</u> and <u>Peter Norvig</u>	Prentice hall
2	<i>Artificial intelligence</i>	3 rd edition	<u>Elaine Rich,</u> <u>Kevin Knight</u>	Mc Graw Hill

MCA/ MCA (LE)

Semester: IV

(Elective-1)

Cryptography and Network Security

OBJECTIVE: To make the students learn the principles and practices of Cryptography, Network Security and to enable the students understand the various methods of encryption and authentication and help them identify the application of these techniques for providing Network and System 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

Advance Topics: Primarily Testing, Fermat's Theorem.

Text Books:

S.No.	Name of Book	Edition	Authors' Name	Publication
1	Cryptography and Network Security: Principles and Practices	5th	William Stallings	Prentice Hall

Reference Books:

S.No.	Name of Book	Edition	Authors' Name	Publication
1	Cryptography and Network Security	8th	Atul Kahate	Tata McGraw-Hills

MCA (LE)
Semester: IV
ADVANCED OPERATING SYSTEM

OBJECTIVE: *This subject deals with the important aspects of a computer operating system, including processes, scheduling algorithms, and memory management. Concepts such as deadlocks, memory management, and file management are detailed.*

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/ MCA (LE)

Semester: V

Computer Graphics

Objective: -The aim of this subject is to show how to generate, manipulate and display graphical images

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.

Advance topics: Boundary representation(B-rep) Octrees, Quad tree ,CSG-Constructive Solid Geometry

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

Reference Book: 1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill

MCA/ MCA (LE)

Semester: V

Data warehousing and data mining

Objective: This subject makes you aware of need of data warehouses that involves data cleaning and data integration, preprocessing step for data mining which will make you aware of different data mining techniques.

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: Clustering, Association rules and Decision trees.

Unit – 5

Web Mining: Web content Mining, Web Usage Mining.

Advance Topics:Spatial Mining, Temporal Mining, Trends in Data Mining

Text Books:

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

Reference Books:

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

MCA/ MCA (LE)

Semester: V

Linux and Shell Programming

Objective: An introduction to shell programming in a UNIX/Linux environment, this course is designed for system administrators or technical users with little or no programming background. Understanding shell programming gives a user full power of the UNIX environment.

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

Advance topic: Files with duplicate lines, counting character, words and lines and comparing files.

Text Book:

1. UNIX - CONCEPTS & APPLICATIONS (THIRD ED.) - SUMITABHA DAS, T ATA
MCGRAW HILL PUBLICATIONS

Reference Books:

1. LINUX: THE COMPLETE REFERENCE - SIXTH EDITION BY RICHARD PETERSEN

MCA/ MCA (LE)

Semester: V

Financial accounting with Tally

OBJECTIVE: To acquaint the students with basic concepts of Tally.ERP 9 and the various uses and application of such in business.

Unit-I: Accounting Concepts

Concepts of Accounting, Manual Vs Computerized Accounting, Golden Rule, Accounting Equation, journal entry, ledger account etc.

Unit-II: Trial balance and final accounts

Ledger- wise trial balance. Trading account, Profit and loss, account, Balance sheet, Outstanding, Practical work and reports

Unit-III: Fundamentals of Tally

Introduction, Creation of Company, Introduction to Gateway of Tally, Menu, Company Info menu. Accounting master: Features, configuration, setting up of account heads, voucher entries, Purchase / Sales order Receipt note, Purchase / Sales bills, Debit / Credit note Journal, Voucher, VAT Bills

Unit-IV: VAT and CST

Configuring VAT in tally

Creating masters, entering transactions, accounting for return of goods, rate difference in purchase/sale, exempt transactions, sales for registered and composite dealers, Vat report

Configuring CST in tally Basics of CST, Recording interstate transactions, payment of CST, CST reports.

Unit-V: Technological efficiencies in tally.erp9

Tally vault, security control, import export of data, tally audit

Advance Topics:- Management controls Concept of control centre. Installing tally.erp9, logging and managing control centre

Online support and help

Text Books

S.No	Name of Book	Edition	Authors' Name	Publication
1	Tally.ERP 9 in Simple Steps		<u>Kogent Learning Solutions Inc.</u>	Dreamtech publications
2	Tally .ERP 9 Training Guide 1st Edition	2009	A. K. Nadhani,	BPB Publications
3	Financial Accounting using tally ERP9.0	2011	A. Mansoor	Pragya Publication

Reference Books:

S.No	Name of Book	Edition	Authors' Name	Publication
1	Tally for Beginners			Tally Press

MCA/ MCA (LE)

Semester: V

ASP.Net with C#(Elective-1)

Objective: This course enables students to know about web development using .Net Technologies.

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

Advanced Java (Elective-II)

Objective: This course is taught to aware about the J2EE, and its advance component, and other advanced packages is JAVA.

Unit-1

Introduction to JFC and Swing, Features of the Java Foundation Classes, Swing API Components, JComponent Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, Check Boxes, Menus, Toolbars, Implementing Action interface, Pane, JScrollPane, Desktop pane, Scrollbars, Lists and Combo Boxes, Text-Entry Components, Colors and File Choosers, Tables and Trees, Printing with 2D API and Java Print Service API. JDBC Introduction, JDBC Architecture, Types of JDBC Drivers, The Connectivity Model, The java.sql package, Navigating the ResultSet object's contents, Manipulating records of a ResultSet object through User Interface, The JDBC Exception classes, Database Connectivity, Data Manipulation (using Prepared Statements, Joins, Transactions, Stored Procedures), Data navigation.

Unit -2

Threads and Multithreading, The Lifecycle of a thread, Creating and running threads, Creating the Service Threads, Schedules Tasks using JVM, Thread-safe variables, Synchronizing threads, Communication between threads. Overview of Networking, Working with URL, Connecting to a Server, Implementing Servers, Serving multiple Clients, Sending EMail, Socket Programming, Internet Addresses, URL Connections, Accessing Network interface parameters, Posting Form Data, Cookies, Overview of Understanding the Sockets Direct Protocol. Introduction to distributed object system, Distributed Object Technologies, RMI for distributed computing, RMI Architecture, RMIRegistry Service, Parameter Passing in Remote Methods, Creating RMI application, Steps involved in running the RMI application, Using RMI with Applets.

Unit -3

What Is a Servlet? The Example Servlets, Servlet Life Cycle, Sharing Information, Initializing a Servlet, Writing Service Methods, Filtering Requests and Responses, Invoking Other Web Resources, Accessing the Web Context, Maintaining Client State, Finalizing a Servlet

Unit -4

What Is a JSP Page?, The Example JSP Pages, The Life Cycle of a JSP Page, Creating Static Content, Creating Dynamic Content, Unified Expression Language, JavaBeans Components, JavaBeans Concepts, Using NetBeans GUI Builder Writing a Simple Bean, Properties: Simple Properties, Using Custom tags, 2 Reusing content in JSP Pages, Transferring Control to Another Web Component, Including an Applet.

Unit -5

Introduction to EJB, Benefits of EJB, Types of EJB, Session Bean: State Management Modes; Message-Driven Bean, Differences between Session Beans and Message-Driven Beans, Defining Client Access with Interfaces: Remote Access, Local Access, Local Interfaces and Container-Managed Relationships, Deciding on Remote or Local Access, Web Service Clients, Method Parameters and Access, The Contents of an Enterprise Bean, Naming Conventions for Enterprise Beans, The Life Cycles of Enterprise Beans, The Life Cycle of a Stateful Session Bean, The Life Cycle of a Stateless Session Bean, The Life Cycle of a Message-Driven Bean Building Web Services with JAX-WS: Setting the Port, Creating a Simple Web Service and Client with JAX-WS.

Text books:

1. J2EE, Complete Reference

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Semester: V

Computer Organization and Architecture

Unit – 1Introduction:

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 – 2Basic 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 – 3I/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 – 4Memory 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 – 5Processor 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.

Additional Reading/Working Topics/Indicative lists: Study of latest microprocessors and collect information about AMD processors.

Text books:

Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization", McGraw-Hill, 2002.

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,

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Semester: VI 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. Dhamdhere, Compiler Construction--Principles and Practice, Second edition, Macmillan India, 1997

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Semester: VI
CLOUD COMPUTING

Objectives:The objective and goal of this course is to provide students fundamental demonstrationson Cloud Computing which is one of the immersing trends in the field of Computer Science and Engineering.

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. GautamShroff, “Enterprise Cloud Computing”, Cambridge University Press.

Reference Books:

1. RajkumarBuyya, Christian Vecchiola, and S.ThamaraiSelvi, “Mastering Cloud Computing”, McGraw Hill Education Pvt Ltd.

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Semester: VI
Python Programming

Objective :- This course has been designed with a need to understand the Python programming language starting from scratch. This course will give you enough understanding on Python programming language from where you can take yourself to a higher level of expertise.

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.

Advance Topics: Sending email

Programming in python 3 mark summer field II edition Addison – Wesley publication

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Semester: VI Entrepreneurship

OBJECTIVE: The course aim to equipping the students with the basic understanding of the entrepreneurship function, along with the skill sets and knowledge required to establish and run an enterprise successfully

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, netpreneursip, ecopreneurship 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.

Advance Topics: Industrial development Corporation (SSIDCs), Khadi and village Industries Commission (KVIC), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI)

Text Books

S.No	Name of Book	Edition	Authors' Name	Publication
1	Management of small scale enterprise		Desai ,Vasant	Himalaya Publishing house
2	Entrepreneur Development New Venture Creation	2 nd edition	Taneja, Gupta	Galgotia Publishing Company

Reference Books:

S.No	Name of Book	Edition	Authors' Name	Publication
1	The 10 Commandments for building a Growth Company	3 rd edition	Brandt,Steven C	Macmillan Business books,Newdelhi
2	Entrepreneurship: Strategies and Resources	1995	Holt,David H	ILLinois ,Irwin