NEHRU GRAM BHARATI

(CBCS BASED)

ORDINANCE, REGULATION & SYLLABUS

For

M.C.A.

[MASTER OF COMPUTER APPLICATION]

Offered by

NEHRU GRAM BHARTI

(DEEMED TO BE UNIVERVISITY),

KOTWA-JAMUNIPUR-DUBAWAL

PRAYAGRAJ-221505

UTTAR PRADESH

Session:

From 2019 – 2020

PREAMBLE

The curriculum of University of higher learning is a living entity. It evolves with time; it reflects the ever changing needs of the society and keeps pace with the growing talent of the students and the faculty. The curriculum of NEHRU GRAM BHARATI (Deemed to be University) is no exception. Half a century of experience in preparing graduates and postgraduates in Computer Application for a wide variety of industries has led to creation of the new curriculum. I sincerely believe that it will meet the aspirations of all stake holders – students, faculty and the employers of the graduates and postgraduates of University. In the university system the curricula and syllabi represented the upper limit of the material to be covered, the teacher having no motivation for stepping outside the defined territory. The curriculum and syllabi only serve as a guideline. The teacher enjoys freedom to expand it in any direction he feels appropriate, incorporates his latest knowledge and stimulates the creative minds of the students. He experiments with new contents and new techniques. A new teaching learning paradigm is born. The curriculum is the culmination of the efforts of large number of faculty members and university staff and reflects their creative contribution. In keeping with the demands of the changing times, it contains many innovative features. I sincerely hope that the faculty and students will take full advantage of the dynamic features of the curriculum and make the teaching-learning process a truly sublime experience for all. On behalf of the Academic council of NEHRU GRAM BHARATI (Deemed to be University), I record my appreciation of the meticulous work done by the, all the faculties of computer application department in compiling the whole curricula of different programmes in this consolidated form. I also record my personal gratitude to the members of the Academic council who have lent every bit of their wisdom to make the contents truly superior.

NEHRU GRAM BHARATI
(Deemed to be University) u/s-3 of UGC Act, 1956
Kotwa-Jamunipur-Dubawal, Prayagraj U.P. (INDIA)

Ref. No.

Date: 24/06/2019

आज दिनांक 24.06.2019 को अपराह्न 11.00 बजे से एम.सी.ए., बी.सी.ए. एवं पी.जी. डी.सी.ए. पाठ्यक्रम के Moderation हेतु Board of study की बैठक विश्वविद्यालय के हनुमानगंज परिसर में सम्पन्न हुई।

उक्त समिति में निम्नलिखित सदस्य उपस्थित रहें–

1. डॉ रणधीर सिंह, यू0 आई0 एम0 इलाहाबाद (वाह्य विशेषज्ञ)।
2. डॉ. हरिमोहन सिंह, एस0एच0 आई0 ए0टी0एस0, नैनी, प्रयागराज (वाह्य विशेषज्ञ)।
3. डॉ. रोहित रमेश, अधिष्ठाता प्रबन्धन एवं कम्प्यूटर विज्ञान, नेहरु ग्राम भारती मानित विश्वविद्यालय, कोटवाँ, जमुनीपुर प्रयागराज (आन्तरिक) अनुपस्थित।
4. श्री अरविन्द कुमार शुक्ल, सहायक आचार्य नेहरु ग्राम भारती मानित विश्वविद्यालय, कोटवाँ, जमुनीपुर, प्रयागराज (आन्तरिक)। TARvind
5. श्री अनुराग त्रिपाठी, सहायक आचार्य, नेहरु ग्राम भारती मानित विश्वविद्यालय कोटवाँ जमुनीपुर प्रयागराज (आन्तरिक)। Anurag
6. श्री ललित कुमार त्रिपाठी, सहायक आचार्य नेहरु ग्राम भारती मानित विश्वविद्यालय, कोटवाँ जमुनीपुर प्रयागराज (आन्तरिक)। K.K. Tripathi
7. श्री उज्जवल दास, सहायक आचार्य नेहरु ग्राम भारती मानित विश्वविद्यालय, कोटवाँ जमुनीपुर प्रयागराज (आन्तरिक)।

उक्त समिति द्वारा एम.सी.ए.,व बी.सी.ए. के पाठ्यक्रमों में संशोधन एवं च्वाइस बेस्ड क्रेडिट सिस्टम एवं पी.जी.डी.सी.ए. में क्रेडिट सिस्टम स्वीकार एवं लागू किया गया। संशोधित पाठ्यक्रम का पठन–पाठन एवं परीक्षा का सम्पादन सत्र 2019–20 से किया जायेगा। यह निर्णय सर्वसम्मति से स्वीकार किया गया।

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(Deemed to be University) u/s-3 of UGC Act, 1956
Kotwa-Jamunipur-Dubawal, Prayagraj U.P. (INDIA)

Ref. No.

Date: 22/06/2019

आज दिनांक 22.06.2019 दिन गुरुवार को कम्प्यूटर अनुप्रयोग विभाग में एक बैठक सम्पन्न हुई, जिसमें **MCA, BCA** के पाठ्यक्रम को संशोधित व च्वाइस बेस्ड क्रेडिट सिस्टम एवं, **PGDCA** क्रेडिट सिस्टम लागू करने की चर्चा हुई एवं आगामी सत्र 2019–20 हेतु **A I C T E** के दिशा निर्देशों के आधार पर MCA Literal Entry के माध्यम से प्रवेश की चर्चा हुई एवं सर्वसम्मति से **A I C T E** एवं विश्वविद्यालय के दिशा निर्देशों का अनुपालन करते हुए MCA Literal Entry प्रवेश एवं समस्त पाठ्यक्रम **MCA, BCA, PGDCA** के **Moderation** हेतु **Board of Study** कराने की सर्वसम्मति से निर्णय हुआ।

उक्त बैठक में विभाग के निम्नलिखित सदस्य उपस्थित रहें–

1– श्री अरविन्द कुमार शुक्ल (विभागाध्यक्ष)

2– श्री अनुराग त्रिपाठी (सहायक आचार्य)

3– श्री उज्ज्वल दास (सहायक आचार्य)

4– श्री ललित त्रिपाठी (सहायक आचार्य)

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(VICE CHANCELLOR)

ORDINANCE FOR MCA PROGRAMME

1. Admission

Admission to M. C.A. First year First semester and Lateral admission in M.C.A. Second year Third semester for (B.C.A./B.sc. (IT)/B.Sc. (C.S.) candidates only will be made as per the rule prescribed by academic council of NEHRU GRAM BHARATI (Deemed to be University).

2. Eligibility For Admission

2.1 Admission to M.C.A First year through entrance examination.

For admission to First year of M.C.A. in university, a candidates must have passed bachelor degree course of 03 years. Minimum duration from any recognized Indian university or equivalent recognized by A.I.U securing minimum 50% (45% For SC/ST) marks in aggregate .A Candidate must have passed mathematics at 10+2 level or graduation level.

2.2 Admission to M.C.A. Second year through lateral entry scheme For admission M.C.A. Second year course (lateral entry) in university a candidate must have passed bachelor degree course of min. three years duration in MCA, B.Sc. (IT /CS) from any recognized Indian university or its. Equivalent recognized by A.I.U. Securing min. 50% (45% for SC/ST) marks in aggregate. The candidate must have passed mathematics at 10+2 or Graduation level.

2.3 Academic council shall have powered to amend are repeal the eligibility criteria led down at clause 2.1, 2.2 as per the guidelines of A.I.C.T.E.

3. Attendance.

3.1 Every student is required to attend all the lecture, tutorials, practical, classes and other prescribed curricular and co-curricular activities the attendance can be condoned a to 25% on medical grounds are for other genuine reasons beyond the control of students.

3.2 The attendance shall be counted for the date of admission in the university or start of academic session, whatever is later.

4. Duration Of Course

4.1 Total duration of the MCA course shall be three years; each year comprising two semester each semester shall normally have teaching for the 90 working days or per prescribed by A.I.C.T.E. to time to time.

4.2 The student admitted MCA First year course shall complete the course with in a period of (05 years.) academic years from the date of first admission, failing which he/she has to discontinue the course.

4.3 The student admitted under lateral entry scheme (Second year of M.C.A. Course) shall complete the course within a period of four (04) academic years from the date of first admission, failing he/she has to discontinue the course.

4.4 The minimum credit requirement. For M.C.A. degree is 144 credits.

5. Examination

5.1 The performance of a student in a semester shall be evaluated through continuous class assessment and end semester examination. The continuous assessment shall be based on class test/assignments /tutorial/quizzes /viva voce and attendance. The marks for continuous assessment (sessional marks) shall be awarded at the end of the semester. The end semester examination shall be comprise of written paper, practical and viva-voce, record of Lab work, Project work, designed reports are by means of any combination of these methods.

5.2 The distribution of mark for sessional, end semester theory paper, practical and other examinations, seminar, project and industrial training shall be as prescribed by the university.

The practical vivo-voce, projects Reports shall be examined (evaluated) through the internal /external examiners.

6. Eligibility Of Passing

6.1 A student who obtained grades A+ to D shall be considered as passed. If a student secured F grade, he/she to reappear for the examination. It is mandatory for a student to earn the required credits as mentioned in each semester.

6.1 (a) For pass in theory subject a student shall secure Minimum of 30% of the maximum marks prescribed in the university examination and 40% of marks in the aggregate marks in the subject including sessional marks i.e. minimum passing grade is 'D'.

6.1 (b) For a pass in a practical / project/ viva-voce examination a student shall secure minimum of 50% of the maximum marks prescribed by the university in the relevant subject of the semester.

6.2 The student who do not satisfy the condition of the clause 6.1 or the student who remain absent shall be deemed to have failed in that subject and may reappear for the university examination in the subsequent examination however the sessional marks

awarded to the student at the previous attempt in the concerned subject will be carried forward.

7. Eligibility For Promotion

7.1 There shall not be any restriction for promotion from an odd semester to the next even semester.

7.2 A student obtaining 2.5 GPA will be promoted to the next Semester but in the final Semester examination there will be no promotion. If a candidate obtains below 30% marks in any paper the result of the candidate will be treated as Incomplete/failed.

Minimum credit for Promotion

Check Point	**Credit threshold**
First year to Second year	24 credit in First year
Second year to Third year	24 credit in second year

7.3 The result of the semester shall be declared pass only on securing D.

8. Carryover System

8.1 Following rules shall be fallowed for carryover papers.

(a) If a student secure F grade will be required to reappear in those theory paper Praticals during respecting and semester exam in which he/she failed.

(b) A candidate satisfying clause 6.1 (b) will be required to exercise his/her choice of Theory paper in which he/she desired to appear in the examination to fulfillment the required of clause 6.1 (a).

(c) A candidate shall be required to exercise his/her choice of minimum theory paper in which he/she desires to appear in the examination for improvement to fulfillment the requirement clause 7.3.

(d) Candidate appearing for carry over paper in any semester shall be examined with the examination paper of that subject running in that semester.

9. Re- Admission In The College/University

A candidate may be allowed for re-admission provided he/she satisfies one of the following condition-

(a) A candidate is declared fail.

(b) A candidate did not appear in a semester examination /or he/she was not granted permission to appear in the examination.

(c) A candidate has been detained by the university and subsequently has been permitted to take re-admission.

(d) A candidate has own desire to abandon the performance of semester (s)

10. Award Of Division. Ranked Medals

10.1 Division shall be awarded only after the final semester examination based on integrated Performance of the candidate for all the six semesters (four semesters for lateral entry) as per following details.

(a) A candidate who qualifies for the award of degree securing D or above grades in all subjects pertaining to all semesters in his/her first attempt within six consecutive semester (three academic years) four consecutive semesters (two academic years) as applicable, and in addition secures a CGPA of 7.5 and above for the semesters I to VI and in case of lateral entry (III to VI) shall be declared to have passed the examination in First division with honors.

(b) A candidate who qualifies for the award of the degree by securing D or above grades in all subjects of all the semesters within a maximum period of six semesters/four semesters as applicable. After his/her commencement of study in the$1^{st}/3^{rd}$ semester and secures. CGPA not less than 6.5 shall be declared to have passed the examination in first division.

(c) All other candidates who qualify for the award of degree by securing D or above grades in all subjects of all semesters within a maximum period of six/four semesters as applicable. After his/her commencement of study in the 1^{st} 3^{rd} semester an addition secures CGPA not less than 5.0 shall be declared to have passed the examination in second division.

10.2 For award of ranks a minimum of 10 students should have appeared in the 6^{th} semester examination. The total number of ranks awarded shall be 10% of total number of students appeared in 6^{th} semester or 10 students. Whichever is less?

11. Unfair Means

Cases of unfair means shall be dealt as per the rules and regulations of the University.

12. **Award Of Sessional Marks**

Sesional marks for theory subjects, practicals and project shall be awarded as prescribed and at pressent the break-up of sessional marks shall be as follows:

(a) Theory Subjects :

(i) Class test which will comprise 30% of total theory marks with three mid-term tests of equal weight age.

(ii) Teacher Assessment Tutorial/Assignment/Quizzes/Attendance comprises 10% of total theory marks.

(b) **Practical's**:

(i) Two mid-term viva-voce/tests of equal weight age 30% of total practical marks.

(ii) Teacher Assessment: Lab, Record/Attendance 20% of total Practical marks.

(c) Make-up test may be held only for those students who could not appear in any one of mid-term class tests due to genuine reasons for which the prior permission from the Head of Institution/College was taken. Make up test shall ordinarily be held about two weeks before the semester examination. The syllabus for the make-up test shall be the whole syllabus covered by the subject teacher up to that time.

13. AWARD OF SEMINAR INDUSTRIAL TRAINING, EDUCATIONAL TOUR MARKS AT INSTITUTION/COLLEGE LEVEL

13.1 The marks of Seminar, Industrial Training, Educational tour marks shall be awarded on the following basis:

(i) Write-up/Report 50%

(ii) Presentation 50%

13.2 The marks in Seminar, Industrial Training and Educational Tour committee consisting of following members:

(i) Head of the Department or his/her nominee

(ii) Concerned Officer In charge.

(iii) Senior Faculty Member of the department nominated by the Head of Department.

14. Cancellation Of Admission

The admission of a student at any stage of study shall be cancelled if:

(i) He / She is not found qualified as per AICTE / Central Government norms and guidelines or the eligibility criteria prescribed by the University. Or

(ii) He / She is found unable to complete the course within the stipulated time as prescribed in clause 4.2 or

(iii) He / She are found involved in creating indiscipline in the Institution / College or in the University.

15. The Academic Council shall have the power to relax any provision provided in the ordinance in any specific matter / situation subject to the approval of Executive Council of the University.

CURRICULAM FOR MCA PROGRAMME

1. **Introduction:**The curriculum for MCA Program of study has been designed with total minimum credits of 144 for those admitted in 1st year of MCA Programme (Direct Entry). The minimum credit requirement will be 96 for those admitted in 2nd year of MCA Programme(Lateral Entry). A student must register a minimum of 20 credits in each semester. Students can also opt open elective subjects from 3rd semester onwards, the total maximum credits of 144 for those admitted in 1st year of MCA Programme (Direct Entry) and the total maximum credits of 96 for those admitted in 2nd year of MCA Programme (Lateral Entry).

2. **Credit System:** A system enabling quantification of course work, with one credit being assigned to each unit after a student completes its teaching-learning process, followed by passing in both Internal Assessment (IA) and End Semester Examination (ESE); Further, Choice Based Credit System (CBCS) to be helpful in customizing the course work for a student, through Core, Electives and Open Electives.

3. **Credit Course:** All Courses registered by a student in a Semester is to earn credits. In a widely accepted definition, students to earn One Credit by registering and passing:

I. One Hour/Week/Semester for Lecture (L) Courses or Tutorials (T); and,
II. Two Hour/Week/Semester for Laboratory/Practical (P).

4. **Curriculum Structure:** MCA degree programme will have a curriculum with Syllabi consisting of following type of courses:

I. **Foundation Course (F):** Include Soft Skills and Business Management (SBM), Mathematics (MT) and Professional & Social Ethos (PSE).

II. **Program Core Courses (PC):** A course, which should compulsorily by studied by a candidate as a core requirement is termed as a Core course. These courses are employability enhancement courses relevant to the chosen program of study. Program core comprises of Theory, Practical, Project, Seminar etc. Project work is considered as a special course involving application of knowledge in solving/ analyzing/exploring a real life situation/ difficult problem

and a candidate studies such a courses on his own with an advisory support by a teacher/faculty member.

III. **Elective Courses:** Elective course is generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/subject of study or with provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill. Accordingly, elective course may be categorizes as:

A. **Program Elective Courses (E):** Programme elective courses include the courses relevant to the chosen programme of study. These courses may be offered by the main discipline/subject of study.

B. **Open Elective Courses (O):** An open elective course is generic in nature and is chosen generally from an unrelated discipline/subject, with an intention to seek exposure. A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Open Elective.

MCA FIRST YEAR FIRST SEMESTER												
S.NO.	COURSE CODE	SUBJECT CODE	TEACHING SCHEME			EVALUATION SCHEME					CREDIT	LECTURES HOUR /WEEK
						SESSIONAL EXAM			ESE	TOTAL		
			L	P	T	CT	TA	TOTAL				
1	MCAC405	DISCRETE MATHEMATICS	4	0	0	30	10	40	60	100	4	4
2	MCAC406	COMPUTER CONCEPTS AND C PROGRAMMING	4	0	0	30	10	40	60	100	4	4
3	MCAC407	COMPUTER ORGANIZATION & ARCHITECTURE	4	0	0	30	10	40	60	100	4	4
4	MCAC408	SYSTEM ANALYSIS AND DESIGN	3	0	0	30	10	40	60	100	3	3
5	MCAI409	PROFESSIONAL COMMUNICATION	3	0	0	30	10	40	60	100	3	3
PRACTICALS												
1	MCACP406	COMPUTER CONCEPTS AND C PROGRAMMING	0	0	4	0	0	50	50	100	2	2
2	MCACP407	COMPUTER ORGANIZATION & ARCHITECTURE	0	0	4	0	0	50	50	100	2	2
	MCAIP409	PROFESSIONAL COMMUNICATION	0	0	4	0	0	50	50	100	2	2

	TOTAL		800	24	24

MCA FIRST YEAR SECOND SEMESTER												
S.NO.	COURSE CODE	SUBJECT CODE	TEACHING SCHEME			EVALUATION SCHEME					CREDIT	LECTURES HOUR /WEEK
						SESSIONAL EXAM			ESE	TOTAL		
			L	P	T	CT	TA	TOTAL				
1	MCAC410	INTRODUCTION TO AUTOMATA THEORY AND FORMAL LANGUAGES	4	0	0	30	10	40	60	100	4	4
2	MCAC411	OBJECT ORIENTED PROGRAMMING USING C++	4	0	0	30	10	40	60	100	4	4
3	MCAC412	DATA & FILE STRUCTURES	4	0	0	30	10	40	60	100	4	4
4	MCAC413	COMBINATORY & GRAPH THEORY	3	0	0	30	10	40	60	100	3	3
5	MCAI414	ACCOUNTING AND FINANCIAL MANAGEMENT USING TALLY	3	0	0	30	10	40	60	100	3	3
PRACTICALS												
1	MCACP411	OBJECT ORIENTED PROGRAMMING USING C++	0	0	4	0	0	50	50	100	2	2

2	MCACP412	DATA & FILE STRUCTURES USING C	0	0	4	0	0	50	50	100	2	2
3	MCAIP414	ACCOUNTING AND FINANCIAL MANAGEMENT USING TALLY	0	0	4	0	0	50	50	100	2	2
	TOTAL									800	24	24

MCA SECOND YEAR THIRD SEMESTER												
S.NO.	COURSE CODE	SUBJECT CODE	TEACHING SCHEME			EVALUATION SCHEME					CREDIT	LECTURES HOUR /WEEK
						SESSIONAL EXAM			ESE	TOTAL		
			L	P	T	CT	TA	TOTAL				
1	MCAC415	OPERATING SYSTEM	4	0	0	30	10	40	60	100	4	4
2	MCAC416	DATABASE MANAGEMENT SYSTEM	4	0	0	30	10	40	60	100	4	4
3	MCAC417	DESIGN AND ANALYSIS OF ALGORITHMS	4	0	0	30	10	40	60	100	4	4
4	MCAE418	ELECTIVE-1	3	0	0	30	10	40	60	100	3	3
5	MCAI419	INTRODUCTION TO ICT RESOURCES	3	0	0	30	10	40	60	100	3	3
PRACTICALS												
1	MCACP416	DATABASE MANAGEMENT SYSTEM	0	0	4	0	0	50	50	100	2	2

Sr. No.	Course Code	Course Title

2	MCACP417	DESIGN AND ANALYSIS OF ALGORITHMS	0	0	4	0	0	50	50	100	2	2
	MCAIP419	INTRODUCTION TO ICT RESOURCES	0	0	4	0	0	50	50	100	2	2
	TOTAL									800	24	24

ELECTIVE-1

1	MCAE418(1)	ARTIFICIAL INTELLIGENCE
2	MCAE418(2)	INFORMATION STORAGE MANAGEMENT
3	MCAE418(3)	INFORMATION SECURITY

MCA SECOND YEAR FOURTH SEMESTER												
S.NO.	COURSE CODE	SUBJECT CODE	TEACHING SCHEME			EVALUATION SCHEME					CREDIT	LECTURES HOUR /WEEK
						SESSIONAL EXAM			ESE	TOTAL		
			L	P	T	CT	TA	TOTAL				

1	MCAC420	DATA COMMUNICATION AND COMPUTER NETWORK	4	0	0	30	10	40	60	100	4	4

Sr. No.	Course Code	Course Title

2	MCAC421	INTERNET AND JAVA PROGRAMMING	4	0	0	30	10	40	60	100	4	4
3	MCAC422	PHYTHON PROGRAMMING	4	0	0	30	10	40	60	100	4	4
4	MCAE423	ELECTIVE-2	3	0	0	30	10	40	60	100	3	3
5	MCAI424	LINUX OPERATING SYSTEM	3	0	0	30	10	40	60	100	3	3
PRACTICALS												
1	MCACP421	INTERNET AND JAVA PROGRAMMING	0	0	4	0	0	50	50	100	2	2
2	MCACP422	PHYTHON PROGRAMMING	0	0	4	0	0	50	50	100	2	2
3	MCAIP424	LINUX OPERATING SYSTEM	0	0	4	0	0	50	50	100	2	2
	TOTAL									800	24	24

ELECTIVE-2

1	MCAE423(1)	PARALLEL COMPUTING
2	MCAE423(2)	CLOUD COMPUTING
3	MCAE423(3)	COMPILER DESIGN

S.NO.	COURSE CODE	SUBJECT CODE	TEACHING SCHEME			EVALUATION SCHEME					CREDIT	LECTURES HOUR /WEEK
						SESSIONAL EXAM			ESE	TOTAL		
			L	P	T	CT	TA	TOTAL				
1	MCAC425	SOFTWARE ENGINEERING	4	0	0	30	10	40	60	100	4	4
2	MCAC426	WEB TECHNOLOGY	4	0	0	30	10	40	60	100	4	4
3	MCAC427	.NET FRAMEWORK USING C#	4	0	0	30	10	40	60	100	4	4
4	MCAE428	ELECTIVE -3	3	0	0	30	10	40	60	100	3	3
5	MCAI429	MULTIMEDIA SYSTEM	3	0	0	30	10	40	60	100	3	3
PRACTICALS												
1	MCACP426	WEB TECHNOLOGY	0	0	4	0	0	50	50	100	2	2
2	MCACP427	.NET FRAMEWORK USING C#	0	0	4	0	0	50	50	100	2	2
3	MCAIP429	MULTIMEDIA SYSTEM	0	0	4	0	0	50	50	100	2	2
	TOTAL									800	24	24

ELECTIVE-3

Sr. No.	Course Code	Course Title
1	MCAE428(1)	CLIENT-SERVER COMPUTING
2	MCAE428(2)	BIG DATA
3	MCAE428(3)	DISTRIBUTED DATABASE SYSTEM

MCA THIRD YEAR SIXTH SEMESTER											
S. NO.	**COURSE CODE**	**SUBJECT CODE**	**TEACHING SCHEME**			**EVALUATION SCHEME**					**CREDIT**
						SESSIONAL EXAM			**ESE**	**TOTAL**	
			L	T	P	CT	TA	TOTAL			
1	MCAIP-430	COLLOQUIUM	0	0	8		100	100		100	4
2	MCAIP-431	INDUSTRIAL PROJECT	0	0	36		250	250	350	600	18
		TOTAL	0	0	44					700	22

MCAC405 : DISCRETE MATHEMATICS

Unit-I:

Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets

Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation.

Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions.

Notion of Proof: Proof by counter-example, the contra-positive, proof by contradiction, inductive proofs.

Unit-II:

Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

Unit-III:

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices.

Boolean Algebra: Basic definitions, Sum of Products and Product of Sums, Form in Boolean Algebra, Logic gates and Karnaugh maps.

Graphs: Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal.

Unit-IV:

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

Unit-V:

Combinatorics: Basic Counting Technique, Pigeon-hole Principle, Recurrence Relation, Generating function, Polya's Counting Theorem

TEXT BOOKS:

1. Discrete Mathematics and Its Applications, By Kenneth H Rosen, McGraw Hill, Sept.2002.
2. Discrete Mathematical Structures with Applications to Computer Science, By J. P. Tremblay, R. Manohar, McGraw Hill Pub, 1975.
3. Graph Theory With Applications to Engineering and Computer Science, By Prentice Hall, Englewood Cliffs, N. J, 1974
4. Combinatorics: Theory and Applications, By V. Krishnamurthy, East-West Press Pvt. Ltd., New Delhi, 1986.

MCAC406:COMPUTER & C-PROGRAMMING

UNIT-1

Introduction To Computers: Computer hardware components, Disk storage, memory, keyboard, mouse, printers, monitors, CD etc., and their functions, Comparison based analysis of various hardware components.

UNIT-II

Basic operating System Concepts: MS-DOS, WINDOWS, Functional knowledge of these operating systems, Introduction to basic commands of DOS, Managing file and directories in various operating systems, Introduction to Internet, Basic terms related with internet, TCP/IP.

UNIT-III

Programming in C: History, Introduction to C-programming languages, Structure of C programs. Compilation and execution of C programs. Debugging techniques. Data types and Sizes. Declaration of variables, Identifiers and keywords, Symbolic constants. Storage classes (automatic, external, register and static), Enumerations, Command line parameters, Macros. The C preprocessor.

UNIT-IV

Operators: Unary operators, Arithmetic & logical operators, Bitwise operators and expressions, Conditional expressions, Precedence and order of evaluation.

Control statements: If-else, switch, break continue, the comma operator, goto statement.

Loops: for, while, do–while.

Functions: built-in and user-defined function declaration, Definition an function call, Parameter passing; Call by value, Call by reference, Recursive functions, multifile programs.

Arrays: Linear arrays, Multidimensional arrays, Passing arrays to functions, Arrays and strings.

UNIT-V

Structure and Union: definition and differences, Self- referential structure.

Address of (&) operators, pointer to pointer, Dynamic Memory allocation, called and malloc function array of pointers, function of pointers, Structures and pointers.

File handling in C: Opening and closing data file, Creating a data file, Read and write functions, Unformatted data files.

TEXT BOOKS:

1 C in Depth – S.K. Srivastava
2 Programming in C- E .Balaguruswami (YMH Publication)
3 Let us C- Y. Kanetkar
4 Exploring with C – Y. Kanetkar

MCAC407:COMPUTER ORGANIZATION AND ARCHITECTURE

Unit-1:

Data Representation in Computer Systems

Introduction, Positional Numbering Systems, Converting Between Bases, Signed Integer Representation, Floating-Point Representation, Character Codes.

Arithmetic

Overview, Fixed Point Addition and Subtraction, Fixed Point Multiplication and Division, Floating Point Arithmetic.

Boolean Algebra and Digital Logic

Introduction, Boolean Algebra, Boolean Expressions, Boolean Identities, K-Maps & Map minimization , Logic Gates, Digital Components, Combinational Circuits, Sequential Circuits.

Unit-2:

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro-operation, Arithmetic Logic Shift Unit, Design of Fast address, Arithmetic Algorithms (addition, subtraction, Booth Multiplication), IEEE standard for Floating point numbers.

Memory Hierarchy, Main Memory (RAM and ROM Chips), organization of 2D and 21/2D, Auxiliary memory, Cache memory, Virtual Memory, Memory management hardware.

Unit 3:

Hardwired & Micro Programmed (Control Unit): Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Hardwired Control, Micro programmed control(Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction).

Unit 4:

Processor Design: Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer.

Input-Output Organization:I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Programmed I/O, Direct Memory access, Input-Output processor, Serial Communication.

Unit 5:

RISC & CICS Architecture, Basic MIPS Implementation, Pipelining, Instruction-level Parallelism, Parallel Processing Challenges, Flynn's Classification, Hardware Multi-threading, Multicore processing.

TEXT BOOKS:

1. Logic and Digital Design, Morris mano and Kimicharels 4th Edition, Prentice Hall.
2. Computer System Architecture, M. Mano(PHI)
3. Computer Organization, Vravice, Zaky&Hamacher (TMH Publication)
4. Structured Computer Organization, Tannenbaum(PHI)
5. Computer Organization, Stallings(PHI)
6. Computer Organization, John P.Hayes (McGraw Hill)

MCAC408:SYSTEM ANALYSIS & DESIGN

UNIT-I

The System concept characteristics of system, physical or abstract system, open and closed system, formal system, informal information system, computer based information system, management information system, decision support system, general business knowledge, problems solving skills, interpersonal communicational system.

UNIT-II

Recognition of need, impetus of system change, feasibility study, analysis designs implementation post-implementation and maintenance.

UNIT-III

Historical perspective the war effort, what does it take to do system analysis, academic personal qualifications, the multifaceted role of the analyst, the analyst/user interface, behavior issues.Strategies for determining information requirement, problem definition and project initiation, background analysis, fact analysis, review of written documents, on site observation, interviews and questionnaires fact analysis, performance analysis, efficiency, service analysis.

UNIT-IV

What kind of system do we need? Information about the firms, information gathering tools, the art of interviewing, arranging the interview, guides to a successful interview type of interviews and questionnaires, the structured alternatives and unstructured alternatives.The data flow diagram construction of DFDs, Data Decision Tree and Structured English.

UNIT-V

System Performance, Economics Feasibility. Technical Feasibility, Behavior Feasibility, Steps in feasibility analysis.Input Design, CRT screen design output design, form design requirements of form design.The computer industry the software industry, a procedure for hardware/software selection major phases in selection, criteria for software selection, the used computer, the computer contract.

REFERENCES:

1. Awad, EM: System Analysis and Design, Galgotia Publications Pvt. Ltd
2. Gane and Sarson: Structured System Analysis and Design.
3. Silver, GA, Silver, ML: System Analysis and Design, Addison-Wesley Publishing Co

MCAI409:PROFESSIONAL COMMUNICATION

Unit-1:

Fundamentals of Communication Technical Communication: features: Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communications; The flow of Communication: Downward, Upward, Lateral of Horizontal (Peer group): Importance of technical communication; Barriers to Communication.

Unit-II:

Constituents of Technical Written Communication Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; Correct Usage: all Parts of Speech; Modals; Concord; Articles; Infinitives; Requisites of Sentence Construction: Paragraph

Development: Techniques and Methods- Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation-various steps.

Unit-III

Business Communication Principles, Sales & Credit letters; Claim and Adjustment Letters; Job application and Resumes. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance, Negotiation & Business Presentation skills

Unit-IV

Presentation Strategies and Listening Skills. Defining Purpose; Audience & Local; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice; Listening Skills: Active Listening, Passive Listening. methods for improving Listening Skills

Unit-V

Value-Based Text Readings Following essays form the suggested text book with emphasis on Mechanics of writing.

(i) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior
(ii) The Language of Literature and Science by A. Huxley
(iii) Man and Nature by J.Bronowski
(iv) The Social Function of Literature by Ian Watt
(v) Science and Survival by Barry Commoner
(vi) The Mother of the Sciences by A.J.Bahm

(vii) The Effect of Scientific Temper on Man by Bertrand Russell.

TEXT BOOKS:

1. Improve Your Writing ed. V.N.Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi
2. Technical Communication: A Practical Approach: Madhu Rani and Seema Verma- Acme Learning
3. Technical Communication- Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press
4. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt.Ltd,2011, New Delhi
5. Business Correspondence and Report Writing by Prof. R.C.Sharma & Krishna Mohan, Tata McGraw Hill & Co.Ltd.,2001, New Delhi
6. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. &Distributors, 2009,Delhi.
7. Developing Communication Skills by Krishna Mohan, Mecra Bannerji- Macmillan India Ltd. 1990, Delhi
8. Manual of Practical Communication by L.U.B.Pandey: A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi
9. English Grammar and Usage by R.P.Sinha, Oxford University Press, 2005, New Delhi.
10. Spoken English- A manual of Speech and Phonetics by R.K.Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi
11. Business English by Ken Taylor, Orient Blackswan, 2011, New Delhi

MCAC410:INTRODUCTION TO AUTOMATA THEORY AND LANGUAGES

Unit-I

Basic concepts of Automata Theory: Alphabets, Strings and Languages, Deterministic Finite Automata (DFA) and Nondeterministic Finite Automata (NFA) – Definition, Representation using Transition Tables and State Diagrams, Language of DFA and NFA. NFA with ε-transitions, Language of NFA with ε-transitions, Equivalence of NFA and DFA.

Unit – II

Regular Expressions and Languages: Introduction, Definition of regular expression, Kleen's Theorem, Equivalence of regular expression and Finite Automata, Pumping Lemma for regular Languages, Closure properties of Regular Languages, Decision properties of Regular Languages, Finite Automata with Output: Moore and Mealy Machine, Equivalence of Moore and Mealy Machines.

Unit – III

Non-Regular Grammars: Definition of Grammar, Classification of Grammars, Chomosky's Hierarchy.Context Free Grammars (CFG) and Context Free Languages (CFL) - Definition, Examples, Derivation trees, Ambiguous Grammars, Simplification of Grammars, Normal forms of CFGs: CNF and GNF, Closure properties of CFLs, Decision Properties of CFLs, Pumping lemma for CFLs. Push Down Automata (PDA): Definition and Description, Language of PDA and its applications.

Unit – IV

Turing Machines: Introduction, Basic Features of a Turing Machine, Language of a Turing Machine, Variants of Turing Machine: Multitapes, Nondeterministic Turing Machine, Universal Turing Machine.Turing Machine as Computer of Integer functions, Halting problem of Turing Machine, Church-Turing Thesis.

Unit – V

Undecidability: Introduction, Undecidable problems about Turing Machines, Rice's Theorem, Post's Correspondence problem (PCP) and Modified PCP. Tractable and Intractable Problems: P and NP, NPComplete Problems, Introduction to recursive function theory.

TEXT BOOKS:

1. Introduction to Automata theory, Languages and Computation, J.E.Hopcraft, R.Motwani, and Ullman. 2nd edition, Pearson Education Asia
2. Introduction to languages and the theory of computation, J Martin, 3rd Edition, Tata McGraw Hill
3. Elements and Theory of Computation, C Papadimitrou and C. L. Lewis, PHI
4. Mathematical Foundation of Computer Science, Y.N.Singh, New Age International

MCAC411:OBJECT ORIENTED SYSTEMS & C++

UNIT-I

Object Modeling:

Object & Classes, Links & Associations, Generation & Inheritance, Aggregation, Abstract Classes, A sample object mode, Multiple Inheritance, Metadata, Candidate Keys, Constraints.

UNIT-II

Dynamic Modelling:

Events & States, Operations & Methods, Nested State Diagrams, Concurrency, Relation of Object & Dynamic Models, Advanced Dynamic Model Concepts, A sample Dynamic Model.

UNIT-III

Functional Modeling:

Functional Models, Data Flow Diagrams, Speifying Operations, Constraints, A Sample Functional Model.

UNIT-IV

Programming in C++

Classes & Objects in C++, Functions, Constructors, Inheritance, Functions Overloading, Operator Overloading, I/O Operations.

Real Life Applications: Extended Classes, Pointer, Virtual Functions, Polymorphisms, Working with files, Classes Templates, Function Templates.

UNIT-V

OMT Methodologies:

Translating object oriented into an implementation, OMT methodologies, examples and case studies to demonstrate methodology, comparison of methodology, SA/SD and JSD.

REFERENCES:

1. D. Ravichandran,"Programming with C++", TMH, 1996.
2. Robert Lafore,"Object Oriented Programming in Turbo C++", Galgotia Publ, 1994.
3. Bjarne Strautrup,"The C++ programming language", addition-Wesley Publ, 1994.
4. S.Halladay and M. Wiebel," Object Oriented Software Engg", BPB Publ, 1995.

MCAC412:DATA & FILES STRUCTURES USING 'C'

UNIT-I

The Representation & Manipulation of Strings : Definition & concepts, string manipulation and pattern matching. Markov algorithm, manipulation in PASCAL with algorithm, storage representation of string, application of string manipulation, application of string manipulation application text handing.

Linear Data Structures: Static and dynamic data Structures, definition, concepts, algorithm & application of stack and queues, dynamic memory allocation and pointers, liked stack and queues, linked lists operation, storage structures, doubly linked list, circularly linked lists implementation, applications, polynomial arithmetic, linked lists in array, abstract data types and their implementation.

UNIT-II

Non-Linear Data Structures: Definition and concept on tree, binary trees, operation, representation, linked and threaded binary trees, conversion of general tress to binary, tree-traversal, application of trees, ordered trees, forests & orchards, formal correspondence, rotation, graphs-terminology and representation, traversal, connected components and spanning trees, shortest path and transitive closure and activity network.

UNIT-III

Searching Tables & Sorting: Notations & Concept sequential search, binary
Search, searching algorithm and their analysis, tables, lgn barier, arrays, tables of various shapes, tables. A new abstract data type, hashing, analysis of hashing, sorting, notations and concepts, insertion sort, selection sort, shell sort, analysis of sorting algorithms, lower bounds, mergsort of linked list, quicksort for contigours list.

UNIT-IV

External Searching & Sorting : Tree search, tree sort, building a binary search, tree height-balance AVL trees, heaps and heapsort, priority queue sorting with disk, sorting with tape.

File Structures : External storage devices, Files, Queries, Sequential organization, random organizations, linked organizations, inverted file cellular partitions, index techniques.

UNIT-V

Recursion : Divide and conquer, postponing the work, principles of recursion, removal of recursion general methods for removing recursion removal by folding, non-recursive quick sort.

References:

1. Tannenbaum, Y. Lanhgsam and A.J.Augenstein,"Data Structures Using C", Prentice Hall of India, 1990
2. Seymour Lipschultz, " Theory and Practice of Data structures", Mc Graw Hill, 1988.
3. E. Horowitz and S.Sahni,"Data structures with Pascal", Galgotia, 3rd edition, 1991.

MCAC413:COMBINATORY & GRAPH THEORY

UNIT-I

Rules of sum and products, permutation, Combination, Permutation groups and application, Probability, Ramsey theory, Discrete numeric function and generating function, Combinatorial problems, Difference equation.

UNIT-II

Recurrence Relation-Introduction, Liner recurrence relation with constant coefficient, Homogeneous solution, Particular solution, Total solution, Solution by the method of generating function.

UNIT-III

Graphs, sub-graphs, Some basic properties, Walk, path & circuits, Connected graphs, Disconnected graphs and component, Eular and Himiltonian graphs, Various operations on graphs, Tree and fundamental circuits, Distance diameters, Radius and pendent Verities, Rooted and binary trees, Counting trees, Spanning trees, Finding all spanning trees of a graph and a weighted graph.

UNIT-IV

Cut-sets and cut vertices, some properties, All cut sets in a graph, Fundamental circuit and cut sets, Connectivity and seperatability, Network flows, Mincut theorem, Planar graphs, Combinatorial and geometric dual, Kuratowski to graph detection of planarity, Geometric dual, Some

UNIT-V

coloring ,covering and portioning of a graph, chromatic number and chromatic partitioning, chromatic polynomials ,matching covering four color problem.

REFERENCE:

1. Deo ,N, Graph Theory With Application To Engineering And Computer Science ,PHI.
2. Gary Chartrand and ping jhang,Introduction of Graph Theory,TMH
3. Robin J Wilson,Introction of Graph Theory ,Pearson Edu.
4. Bondy and murthy ,"Graph Theory and applications ,addition Wesley.

MCAI414: ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I

Overview: Accounting concepts, conventions and principles; Accounting Equation, International Accounting principles and standards; Matching of Indian Accounting Standards with International Accounting Standards.

UNIT II

Mechanics of Accounting: Double entry system of accounting, journalizing of transactions; preparation of final accounts, Trading Account, Manufacturing Accounts,Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet, Policies related with depreciation, inventory and intangible assets like copyright, trademark, patents and goodwill.

UNIT III

Analysis of financial statement: Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios ; Common Size Statement ; Comparative Balance Sheet and Trend Analysis of manufacturing, service & banking organizations.

UNIT IV

Funds Flow Statement: Meaning, Concept of Gross and Net Working Capital, Preparation of Schedule of

Changes in Working Capital, Preparation of Funds Flow Statement and its analysis ; Cash Flow Statement: Various cash and non-cash transactions, flow of cash, preparation of Cash Flow Statement and its analysis.

UNIT-V

Introduction to Computerized Accounting System: Coding logic and codes required, master files, transaction files, introduction to documents used for data collection. Processing of different files and outputs obtained.

TEXT BOOKS:

1. Narayanswami - Financial Accounting: A Managerial Perspective (PHI, 2nd Edition).
2. Mukherjee - Financial Accounting for Management (TMH, 1st Edition).
3. Ramchandran & Kakani - Financial Accounting for Management (TMH, 2nd Edition).
4. Ghosh T P - Accounting and Finance for Managers (Taxman, 1st Edition).
5. Maheshwari S.N & Maheshwari S K – An Introduction to Accountancy (Vikas, 9th Edition)
6. Ashish K. Bhattacharya- Essentials of Financial Accounting (PHI, New Delhi)
7. Ghosh T.P- Financial Accounting for Managers (Taxman, 3rd Edition)
8. Maheshwari S.N & Maheshwari S K – A text book of Accounting for Management (Vikas, 1st Edition)
9. Gupta Ambrish - Financial Accounting for Management (Pearson Education, 2nd Edition)
10. Chowdhary Anil - Fundamentals of Accounting and Financial Analysis (Pearson Education, 1st Edition)
11. P.H.Barrett," Computerized Accounting", BPB.

MCAC415: OPERATING SYSTEM

UNIT-I

Introduction

Definition and Types of Operating Systems, Bath System, Multi Programming, Time-Sharing parallel, Distributed and Real-Time Systems, Operating System Structure, Operation System Components and Services, System Calls, System Programs, Virtual machines.

UNIT -II

Process Management

Process Concept, Process Scheduling, Cooperating Processes, Threads, interposes Communication, CPU Scheduling Criteria, Scheduling Algorithm, Multiple-Processor Scheduling, Real-Time Scheduling and Algorithm Evaluation.

UNIT -III

Process Synchronization & Deadlocks

The Critical-Section Problem, Synchronization Hardware, Semaphores Classical Programs of Synchronization, Critical Regions, Monitors Deadlocks-System Model, Characterization, Deadlock Prevention Avoidance and Detection, Recovery from Deadlock, Combined Approach to Deadlock Handling.

UNIT -IV

Storage Management

Memory Management- Logical and Physical Address Space, Swapping Contiguous Allocation, Paging, Segmentation with paging in MULTICS and Intel 386, Virtual Memory, Demand paging and its performance page Replacement Algorithms, Allocation of Frames, Thrashing, Page Size and other considerations, Demand Segmentation, File System Secondary Storage Structure, File concept, Access Methods, Director implementation, Efficiency and performance, Recovery, Disk Structure, Disk Scheduling Methods, Disk Management, Swap-Space Management Disk Reliability.

UNIT -V

Security & Case Study

Protection and Security- Goals of Protection, Domain of Protection Access Matrix, Implemetati9on pf Access Matrix, Revocation of Access Right, Language based protection, The security Problem Authentication, One-Time Password, Program Threats, System Thetas Threat Monitoring Encryption.

Window NT-Design Principles, System Components, Environments Subsystem, File Systems, Networking and program interface, Linux Systems- Design Principles, Kernel Modules, Process Management, File Systems, Input and output, Interposes Communication, Network Structure, Security.

TEXT BOOK:

1. Peterson, Silberscahatz, "Operating System Concepts", Addison-Wesley publishing Co; 2nd, Ed., 1985.
2. Andrew S. Tanenbaum "Modern Operating System".
3. Harvey M. Deital, "Operating System", Addison Wesley.
4. Richard Peterson, "Linux : The Complete Reference", Osborne McGraw-Hill.

MCAC416: DATABASE MANAGEMENT SYSTEM

UNIT- I

Introduction: An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML.

Data Modeling using the Entity Relationship Model:

ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

UNIT - II

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus,

Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.

UNIT III

Data Base Design & Normalization:

Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

UNIT – IV

Transaction Processing Concepts*:* Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

UNIT - V

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

REFERENCES

1. Date C J, "An Introduction To Database System", Addision Wesley.
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill.
3. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley
4. Leon & Leon, "Database Management System", Vikas
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
6. Majumdar & Bhattacharya, "Database Management System", TMH
7. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill
8. Kroenke, "Database Processing: Fundamentals, Design and Implementation", Pearson Education.
9. Maheshwari Jain, "DBMS: Complete Practical Approach", Firewall Media, New Delhi.

MCAC417: DESIGN AND ANALYSIS OF ALGORITHM

UNIT-I

Introduction

Algorithm, Analysis of Algorithms, Design of Algorithm, and Complexity, Asymptotic Notations, Growth of function, Recurrence

Sorting in Polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort sorting in Linear Time: Counting sort, Radix Sort, Bucket sort

Medians and order statistics

UNIT -II

Elementary Data Structure: Stacks, Queues, Linked list, Binary Search Tree, Hash Table

Advanced Data Structure: Red Black Trees, Splay Trees, Augmenting Data Structure Binomial Head, B-Tree, Fibonacci Heap, and Data Structure for Disjoint Sets.

Union-find algorithm, Dictionaries and priority Queous, Mergeable heaps, concatenable queues.

UNIT -III

Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-Bound, Amortized Analysis.

UNIT -IV

Graph Algorithm: Elementary Graph Algorithms,Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Single Source Shortest Path, All Pair Shortest Path, Maximum flow and Traveling Salesman Problem.

UNIT -V

Randomized Algorithms, String Matching, NP-Hard and NP-Completencess

Approximation Algorithms, Sorting Network , Matrix Operations, Polynomials & the FFT Number Theoretic Algorithms, Computational Geometry.

REFERENCES

1. Horowitz Sahani, "Fundamentals of Computer Algorithms", Golgotia
2. Coremen Leiserson etal, "Introduction to Algorithms", PHI
3. Brassard Bratley, "Fundamental of Algorithms", PHI
4. M T Goodrich etal, "Algorithms Design", Wiley
5. A V. Aho etal, "The Design and analysis of Algorithms", Pearson Education.

MCAE418 (1):ARTIFICIAL INTELLIGENCE

UNIT-I

INTRODUCTION:- Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

UNIT-II

INTRODUCTION TO SEARCH:- Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

UNIT-III

KNOWLEDGE REPRESENTATION & REASONING:- Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

UNIT-IV

MACHINE LEARNING:- Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data - EM algorithm, Reinforcement learning,

UNIT-V

PATTERN RECOGNITION:- Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbour (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

TEXT BOOK:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson Education
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill
3. E Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson Education
4. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India

MCAE418(2): INFORMATION STORAGE MANAGEMENT

UNIT-I:

Introduction to Storage Technology

Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.

UNIT-II:

Storage Systems Architecture

Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end anagement, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols.

UNIT-III:

Introduction to Networked Storage

JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management, Storage Area Networks (SAN): elements & connectivity, Fibre Channel principles, standards, & network management principles, SAN management principles, Network Attached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), & management principles, IP SAN elements, standards (SCSI, FCIP, FCP), connectivity principles, security, and management principles, Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage solutions overview including technologies like virtualization & appliances.

UNIT-IV: Introduction to Information Availability

Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques.

UNIT-V: Managing & Monitoring

Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and pro-active management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview.

TEXT BOOK:

1. Information Storage and Management Storing, Managing, and Protecting Digital Information , by EMC, Hopkinton and Massachusetts, Wiley, **ISBN:** 97881265214
2. Information storage and management : storing, managing, and protecting digital information by Wiley Pub G Somasundaram, Alok Shrivastava
3. MeetaGupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002
4. Robert Spalding, “Storage Networks: The Complete Reference”,TataMcGraw Hill,Osborne, 2003.
5. Marc Farley, “Building Storage Networks”, TataMcGraw Hill, Osborne. 2001.

MCAE418(3): INFORMATION SECURITY

UNIT-I

Introduction to Information Security: History and evaluation of Information security CIA triangle ,Components of IS, Control in IT environment, Information security Managementsystem, components of ISMS and conceptual framework , Steps for developing ISMS Need of Information security: Threats to information security, Risk to Information systems

Information security in organization, Introduction to cyber crimes and attacks , Information security policy, policy definition and security life cycle.

UNIT-II

Information Security Policy and Standards: Security principles, Types of Information security policies- Administrative and Technical,A structure and framework of compressive security policy, policy infrastructure, policy design life cycle and design processes, PDCA model, Security policy standards and practices - BS7799, ISO/IEC 17799, ISO 27001. Auditing tools such as ISO 27001 ISMS TOOL KIT, NGS AUDITOR, Windows password auditor, ISO IES 27002 2005 IS AUDIT TOOL.

UNIT-III

IT Governance: What is IT Governance, good governance, objectives and dimensions, foundation, structure, processes,IT governance framework- COBIT, ITIL, ISO 17799, IT governance maturity model. Ethical hacking.

UNIT-IV

Audit:Auditing concepts ISA need, concept, standards, performance, steps, Techniques, methodologies, around and through computer, Controls – Concept objectives, types, risk. Controls: Input, process, validation, output, logical access, physical access, Database, network, environment, BCP, Evidence collection, evaluation and Reporting methodologies.

Text Books:

1. Information security policies, procedures and standards by Thomas Pettier.
2. Information security Management Hand book- 5th Edition-HAROLD F. TIPTON
3. Computer security by Alfred Basta, Wolf Halton

Reference Books:

1. Information security policies- Thomas R.Peltier, Peltier R. Peltier
2. Electronic Signature law by L Padmavathi
3. Network Security by AnkitFadia
4. Security Plus study guide by Michael Cross, Norrris Johnson
5. Information systems control and Audit by Ron Weber, Pearson Pub.
6. IS control journals from ISACA
7. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices (With Cd) : Nina Gobole
8. Information Security policies made easy version 10: Charles Cresson Wood

MCAI419:INTRODUCTION TO ICT RESOURCES

UNIT I: PC Assembly and Operation

Assembly and Disassembly of PC and its various Parts, Startup Process (Booting),

BIOS Setup, CMOS Setup and meaning of its various setting, Installation of Windows XP operating System, Installation of Other Software Packages such as Ms Office etc. Operation of Printer, Installation of printer driver, Backup and Restore Operations Troubleshooting PC Problems

UNIT II: Utilities

Compression Utilities: WinZip, PKZIP, Concept of compression, Defragmenting Hard, disk using defrag, Scan Disk for checking disk space, lost files and recovery, Formatting Hard disk, Floppy Disk, Setting System Date and Time, Antivirus Package
CD Writing Sofware – Nero etc.

UNIT III: Networking Concepts

What is Networking, Local Area Networking (LANs), Metropolitan Area Network , MAN), Wide Area Network (WAN), Networking Topologies, Transmission media & method of communication, Cabling: straight through and cross over, Study of components like switches, bridges, routers, Wifi router etc., communication Protocols, TCP/IP, IP addressing, MAC address, Subnetting

UNIT IV: Network Administration

Installing and configuring the network using Windows NT based System, Administration of Windows NT based network, Creation of user and groups, File Sharing, Printer Sharing

RECOMMENDED BOOKS

1. Scott and Mueller, “Upgrading and Repairing PCs”, Techmedia, New Delhi
2. Troubleshooting, Maintenance and Repairing PCs, Fifth Edition, by Stephen J. Bigelow, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. PC Upgrade and Maintenance Guide, 15th Edition, by Marks Minasi, BPB Publications
4. Basic of Networking. ”NIIT “, Prentice, Hall of India Private Limited.
5. Networking Protocols and Standards. ”NIIT “, Prentice, Hall of India Private Limited.
6. William Stallings, “Data and Computer Communication”, Prentice, Hall of India Private Limited.

MCAC420: DATA COMMUNICATION & COMPUTER NETWORKS

UNIT-I

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Lauer-transmission, switching methods, integrated services digital networks, terminal handing.

UNIT-II

Medium access Sub layer: Channel allocations, LAN protocols- Pure ALOHA, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, FDDI, data Link Layer-elementary data link protocols, sliding windows protocols error handing, High Level Data Link Control

UNIT-III

Network Layer : Point networks, routing algorithms, congestion control algorithms, internetworking, TCP/IP packet, IP addresses, Ipv6.

UNIT -IV

Transport Layer: Design Issues, connection management, TCP window Management, User Datagram protocol.

UNIT -V

Network Security, DES, RSA algorithms, Domain Name System, Simple Network Management Protocol, Electronic Mail, File Transfer Protocol, hyper Text Transfer Protocol, Cryptography and compression Techniques.

Reference

1. A.S Tanenbaum, "Computer Network, 3rd Edition", PHI
2. W.Stalling, "Data and Computer Communication", Macmillan Press
3. Comer, "Computer Networking & Internet", PHI.
4. Comer. "Internetworking with TCP/IP", PHI.
5. Forouzan, "Data Communication and Networking", TMH.

MCAC421:INTERNET AND JAVA PROGRMMING

UNIT -I

Internet: Internet, Connection to Internet: Telephone, cable, Satellite connection, Choosing an ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing.

UNIT -II

Core Java : Introduction, Operator, Data type, Variable, Arrays, Control Statements, Methods s & Classes, inheritance, Inheritance, Package and Interface, Exception Handing, Multithread programming, I/O, Java Applet, String handing, Networking, Event handing, introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics.

UNIT -III

Java Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars,

, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame.

JBDC: The Conductivity Model, JDBC/ODBC Bridge, Java..Sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

UNIT -IV

Java Beans: Application Builder Tools, The bean developer kit (BDK), JAR files introspection, Developing a simple bean, using Bound properties The java Beans API, Session, Beans, Entity Beans, introduction to Enterprise Java beans(EJB), **Introduction to RMI (Remote Method Invocation):** A Simple client-server application using RMI.

UNIT -V

Java Servlets: Servlet basics, Servlet API basic, Life cycle of a Servlet , Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server Pages (JSP)

REFERENCES: -

1. Internetworking With TCP/IP Vol-I Third Edition (Phi) By Douglas E. Comer
2. Java 2 The Complete Reference By Petric Noughton And Herbet Schildt.
3. Margaret Levine Young "The Complete Refrence Internet"TMH
4.Hteven Holzner,"Java 2 Black book"dreamtech

MCAC422:PYTHON PROGRAMMING

UNIT I: Introduction: History, Features **Working with Python:** Basic Syntax, Variable and Data Types, Operator **Conditional Statements:** If, If- else, Nested if-else, elif **Looping:** For, While, Nested loops
Control Statements: Break, Continue, Pass **String Manipulation:** Accessing Strings, Basic Operations, String slices, Function and Methods **Lists:** Introduction, Accessing list, Operations, Working with Lists, List **Tuple:** Introduction, Accessing tuples, Operations Working, Functions and Methods **Dictionaries:** Introduction, Accessing values in dictionaries, working with dictionaries, Properties and Functions
Functions and Methods Functions: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables.
UNIT II :

Modules: Importing a module, Math module, Random module, Packages, Composition
Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Inbuilt-Functions
Exception Handling: Exception, Exception Handling, Except clause, Try & finally clause, User Defined Exceptions
OOPs concept: Class and object, Attributes, Inheritance, Overloading, Overriding, Data hiding, Use of self method, _init_ method

UNIT III:
Regular expressions: Match function, Search function, Matching VS Searching, Modifiers, Patterns
Database: Introduction, Connections, Executing queries, Transactions, Handling error
Multithreading: Thread, Starting a thread, Threading module, Synchronizing threads, Multithreaded Priority Queue.
Text Books:
• Charles Severance, “Python for Informatics”, 1st Edition, CreateSpace Independent Publishing Platform, 2013.
• Peter Wentworth, Jeffrey Elkner, Allen B. Downey, and Chris Meyers, “How to Think Like a Computer Scientist: Learning with Python”, 2nd Edition, Open Book Project, 2012
Reference Books:
• Mark Lutz, “Learning Python”, 5th Edition, O’Reilly Media, 2013.
• Wesley Chun, “Core Python Applications Programming”, Prentice Hall, 3rd Edition, 2012
• Alex Martelli,” Python in a Nutshell”, 2nd Edition, O’Reilly Media, 2006

MCAE423(1):PARALLEL COMPUTING

UNIT-I

Parallel Computers-Introduction: The Demand of Computational Speed, Types of Parallel Computers, Architectural Features of Message passing Multicomputer, Networked Computers as a Multicomputer Platform, Potential for increased computational speed. Parallel Computer Architecture: A Taxonomy of Parallel Architectures, Control Mechanism, Address-space Organization, Interconnection Networks, Processors Granularity ;SIMD Architecture : Overview of SIMD Architecture, Design and Performance Issues; **MIMD Architecture :** Shared Memory Architecture, Uniform and Non-uniform Memory Access Multi Processors, Parallel Vector Processors (PVP), Symmetric Multiple Processors (SMP), CC-NUMA, NUMA and COMA Architectures.**Distributed Memory Architecture:** Cluster Architecture - Design and other Issues ,MPP Architecture.

UNIT-II System Interconnection and Gigabit Network Basics of Interconnection Network: Network Topologies and Properties, Buses, Crossbar, and Multistage switches, Gigabit Network Technologies, Comparison of Network Technologies Parallel Programming: Paradigms and Programmability: Algorithmic Paradigms,

Programmability issues Parallel Programming Examples; **Parallel Programming Models :**Implicit Parallelism, Explicit Parallel Models, Other Parallel Programming Models ;Shared Memory Programming : The POSIX Threads (P-threads) Model, The Open MP Standard; **Message-Passing Programming :** The

Message Passing Paradigm, Message Passing Interface (MPI), Parallel Virtual Machine (PVM). **Data Parallel Programming:** The Data Parallel Model, The Fortran 90 Approach, Other Data Parallel Approaches.

UNIT-III Performance Metrics and Benchmarks: Performance Metrics for Parallel Systems, Run Time, Speedup, Efficiency Cost. **Scalability and Speedup Analysis:** Amdahl's Law: Fixed Problem Size, Gustafson's Law: Fixed Time, Sun and Ni's Law: Memory Bounding, Iso performance Models. **System and Application Benchmarks :** Micro Benchmarks, Parallel Computing Benchmarks, Business and TPC Benchmarks, SPEC Benchmark Family ; Performance v/s Cost, Performance of parallel Computers, Performance of Parallel Programs. **Parallel Paradigms and Programming Models:** Parallel Programming Models, Implicit Parallelism, Explicit Parallel Models, Other Parallel Programming Models. **Shared Memory Programming:** The POSIX Threads (P-threads) Model, The Open MP Standard

UNIT-IV Message-Passing Programming: The Message Passing Paradigm, Message Passing Interface (MPI), Parallel Virtual Machine (PVM).**Data Parallel Programming:** The Data Parallel Model, the FORTRAN 90 Approach, Other Data Parallel ApproachesParallel

Algorithms and Applications Sorting Algorithms, Searching Algorithms, Dynamic Programming, Matrix Multiplication, Dense Matrix Computations, Sparse Matrix Computations

Text Books: 1. Kai Hwang and ZhiweiXu, “Scalable Parallel Computing”, 1997, McGraw Hill New York. 2. Barry Wilkinson and Michael Allen, “Parallel Programming”, 1999, Pearson Education Asia. **Reference Books**: 1. Steven Brawer, “ Introduction to Parallel Programming” 2. M. Shasikumar, Dinesh shikhare and P. Ravi Prakash, “Introduction to Parallel Processing”. 3. V. Rajaraman and C. Siva Ram Murthy, “Parallel Computers-Architecture and Programming”

MCAE423(2):CLOUD COMPUTING

UNIT I

Introduction

Cloud-definition, benefits, usage scenarios, History of Cloud Computing - Cloud Architecture - Types of Clouds - Business models around Clouds – Major Players in Cloud Computing- issues in Clouds - Eucalyptus - Nimbus - Open Nebula, Cloud Sim.

UNIT II

Cloud Services

Types of Cloud services: Software as a Service-Platform as a Service –Infrastructure as a Service - Database as a Service - Monitoring as a Service –Communication as services.
Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force.

UNIT III

Collaborating Using Cloud Services

Email Communication over the Cloud - CRM Management - Project Management-Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware.

UNIT IV

Virtualization for Cloud

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - supervisors – Xen,
KVM , VMWare, Virtual Box, Hyper-V.

UNIT V

Security, Standards And Applications

Security in Clouds: Cloud security challenges – Software as a Service Security,Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

TEXT BOOK:

1. David E.Y. Sarna Implementing and Developing Cloud Application, CRC press 2011.
2. Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas, NIST, Draft cloud computing synopsis and recommendation, May 2011.
3. Anthony T Velte, Toby J Velte, Robert Elsenpeter, Cloud Computing : A Practical Approach, Tata McGraw-Hill 2010.
4. Haley Beard, Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
5. G.J.Popek, R.P. Goldberg, Formal requirements for virtualizable third generation Architectures, Communications of the ACM, No.7 Vol.17, July 1974

6. John Rittinghouse & James Ransome, Cloud Computing, Implementation, Management and Strategy, CRC Press, 2010.
7. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Que Publishing, August 2008.
8. James E Smith, Ravi Nair, Virtual Machines, Morgan Kaufmann Publishers, 2006.

MCAE423(3:)COMPILER DESIGN

UNIT-1

Compiler Structure: Compilers and Translators, Various Phases of Compiler,

Pass Structure of Compiler, Bootstrapping of Compiler

Programming Languages: High level languages, The lexical and syntactic structure of a language, Data elements, Data Structure, Operations. Assignments, Program unit, Data Environments, Parameter Transmission.

Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Regular Expressions, Transition Diagrams. Finite state Machines, Implementation of Lexical Analyzer, Lexical Analyzer Generator: LEX, Capabilities of Lexical Analyzer

UNIT-II

The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG.

Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, (SLR, Canonical LR, LALR)

Syntax Analyzer Generator: YACC

UNIT-III

Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition,

Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

UNIT-IV

Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management

Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

UNIT-V

Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

References:

1- Alfred V Aho, Jeffrey D. Ullman, “Principles of Compiler Design” Narosa
2- A.V. Aho, R. Sethi and J.D. Ullman, “Compiler: principle, Techniques and Tools”,AW
3- H.C. Holub “Compiler Design in C”, Prentice Hall Inc.
4- Apple, “Modern Computer Implementation in C: Basic Design”, Cambridge press

MCAI424:LINUX OPERATING SYSTEM

UNIT I

Theoretical Concepts of LINUX Operating System: Basic Features of Operating System, File Structure, CPU Scheduling. **Memory management:** Swapping, Demand Paging; File system: ext2 and ext3 architecture, Blocks and Fragments, Inodes Directory Structure. **Getting Started with LINUX:** User Names and Groups; Logging in; Changing your password; Format of LINUX commands.

UNIT II

Characters with special meaning, LINUX Documentation, Files and Directories : Current Directory, Access the directory contents, absolute and relative pathnames, some LINUX directories and files, Access file contents, file permissions, changing permission modes, Standard files, Standard output, Standard input, Standard Error, Filters and Pipelines, Processes: PID,PPID, Process creation, killing a process, stopping background process; LINUX VIth Editor. **Text Manipulation:** Inspecting Files; File Statistics; Searching for Patterns, Comparing Files; Operating on Files; Printing Files; Rearranging Files; Sorting Files; Splitting Files; Translating characters.

UNIT III

Shell Programming: Programming in the Borne and the C-shell: Wild cards, simple shell programs, shell variables, shell programming constructs, interactive shell scripts, Advanced features. **System Administration:** Definition, Booting the system, Maintaining user accounts, File system and special files, Backups and restoration, Role and functions of a system manager.

UNIT IV

System Calls : C as System Programming Language, I/O system calls – umask(); create(); open(); read(); write(); lseek(); dup(); link(); access(); chmod(); chown(); Process management system calls; fork(); getpid(); getppid(); exit(); wait(); sleep() ; Signal system calls – kill(); signal().

Text Books: 1. Parker, Tim: Linux Unleashed, Latest Edition, Techmedia.
2. Tackett, J.: Special Edition using LINUX, PHI.
3. Norton, P.: Complete Guide to LINUX, Techmedia.

Reference Books: 1. Komarinski, M.: LINUX System Administration Handbook, Prentice Hall.

2. Stones, Richard and Mathew Neil: Beginning Linux Programming, 3rd Edition, Wrox.
3. Nyus, Christopher, 2006: Linux Bible, Wiley.
4. Graham, Steven: Linux Administration, Tata McGraw.
5. Jones, Tim: GNU/Linux Application Programming, Wiley India Pvt. Ltd.

MCAC425: SOFTWARE ENGINEERING

UNIT-I:

Introduction:

Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT-II:

Software Requirement Specifications (SRS)

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS.

Software Quality Assurance

(SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

UNIT-III:

Software Design:

Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs

UNIT-IV:

Software Testing:

Testing Objectives, Unit Testing, Integration Testing, 8 Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance,

Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products.

Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

UNIT-V:

Software Maintenance and Software Project Management 8

Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource allocation Models, Software Risk Analysis and Management.

REFERENCES:

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
4. Pankaj Jalote, Software Engineering, Wiley
5. Deepak Jain,"Software Engineering:Principles and Practices",Oxford University Press.

MCAC426: WEB TECHNOLOGY

UNIT I. **Introduction:**

Introduction and Web Development Strategies, History of Web and Internet, Protocols governing Web, Writing Web Projects, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing.

Core Java: Introduction, Operator, Data type, Variable, Arrays, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Event handling, Introduction to AWT, AWT controls, Layout managers.

UNIT II. **Web Page Designing:**

HTML: list, table, images, frames, forms, CSS, Document type definition, XML: DTD, XML schemes, Object Models, presenting and using XML, Using XML Processors: DOM and SAX, Dynamic HTML.

UNIT III. **Scripting:**

Java script: Introduction, documents, forms, statements, functions, objects; introduction to AJAX, VB Script, Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API.

UNIT IV. **Server Site Programming:**

Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, Sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP, Introduction to Servelets, Lifecycle, JSDK, Servlet API, Servlet Packages, Introduction to COM/DCOM/CORBA.

UNIT V. **PHP (Hypertext Preprocessor):**

Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC,

TEXT BOOKS:

1. Burdman, Jessica, “Collaborative Web Development” Addison Wesley
2. Xavier, C, “ Web Technology and Design” , New Age International
3. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication
4. Bhave, “Programming with Java”, Pearson Education
5. Herbert Schieldt, “The Complete Reference:Java”, TMH. 6. Hans Bergsten, “Java Server Pages”, SPD O’Reilly
6. Ullman, “PHP for the Web: Visual QuickStart Guide”, Pearson Education
7. Margaret Levine Young, “The Complete Reference Internet”, TMH
8. Naughton, Schildt, “The Complete Reference JAVA2”, TMH
9. Balagurusamy E, “Programming in JAVA”, TMH

References:

1. Ramesh Bangia, “Internet and Web Design” , New Age International
2. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication
3. Deitel, “Java for programmers”, Pearson Education
4. Chris Bates, “Web Programing Building Internet Applications”, 2nd Edition, WILEY, Dreamtech
5. Joel Sklar , “Principal of web Design” Vikash and Thomas Learning
6. Horstmann, “CoreJava”, Addison Wesley

MCAC427: MICROSOFT .NET FRAMEWORK USING C#

UNIT-1

The .Net framework: Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In –Time Compilation, Framework Base Classes.

UNIT-II

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-III

C# Using Libraries: Namespace- System, Input-Output, Multi-Threading, Networking and sockets, Managing Console I/O Operations, Windows Forms, Error Handling.

UNIT-IV

Advanced Features Using C#: Web Services, Window Services, Asp.net Web Form Controls, ADO.Net. Distributed Application in C#, Unsafe Mode, Graphical Device interface with C#.

UNIT-V

.Net Assemblies and Attribute: .Net Assemblies features and structure, private and share assemblies, Built-In attribute and custom attribute. Introduction about generic.

TEXT BOOK:

1. Wiley,” Beginning Visual C# 2008”,Wrox
2. Fergal Grimes,” Microsoft .Net for Programmers”. (SPI)
3. Balagurusamy,” Programming with C#”, (TMH)
4. Mark Michaelis, “Essential C# 3.0: For .NET Framework 3.5, 2/e, Pearson Education

5. Shibi Parikkar, " C# with .Net Frame Work" , Firewall Media.

MCAE428 (1): CLIENT SERVER COMPUTING

UNIT-I

Client/Server Computing: DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

UNIT-II

Components of Client/Server application: The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA).
The serve: Detailed serve functionality, the network operating system, available platforms, the network operating, available platform, the server operation system.

UNIT-III

Client/Server Network: connectivity, communication interface technology. Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management, Client-server system development: Software, Client-Server System Hardware: Network Acquisition, PC-level processing unit. Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

UNIT-IV

Data Storage: magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance, RAID, RAID-Disk network interface cards.
Network protection devices, Power Protection Devices, UPS, Surge protectors.
Client Server Systems Development: Services and Support, system administration, Availability, Reliability, Serviceability, Software Distribution, Performance, Network management, Help Disk, Remote Systems Management Security, LAN and Network Management issues.

UNIT- V
Client/Server System Development: Training, Training advantages of GUI Application, System Administrator training. Database Administrator training, End-user training.

The future of client server Computing Enabling Technologies, The transformational system.

References:

1. Patrick Smith & Steave Guengerich, "Client/Server Computing", PHI
2. Dawna Travis Dewire, "Client/Server Computing", TMH
3. Majumdar & Bhattacharya, "Database management System", TMH
4. Korth, Silberchatz, Sudarshan, "Database Concepts", McGraw Hill
5. Elmasri, Navathe, S.B. "Fundamentals of Data Base System", Addison Wesley

MCAE428 (2): BIG DATA

UNIT-I:
Understanding big data
What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data ,credit risk management, big data and algorithmic trading, big data and HealthCare, big data in medicine, advertising and big data, big data technologies, Introduction to Hadoop, open source technologies, cloud and big data mobile business intelligence, Crowd sourcing Analytics ,inter and trans firewall analytics
UNIT-II:
Nosql data management
Introduction to NoSQL , aggregate data models ,aggregates ,key-value and document data models, relationships, graph databases, schema less databases ,materialized views, distribution models ,sharing , masters slave replication , peer-peer replication , shareing and replication , consistency , relaxing consistency , version stamps , map reduce , partitioning and combining , composing map-reduce calculations
UNIT-III:
Basics of hadoop Data format, analyzing data with Hadoop , scaling out , Hadoop streaming , Hadoop pipes , design of Hadoop distributed file system (HDFS) , HDFS concepts , Java interface , data flow ,Hadoop I/O , data integrity , oppression ,serialization , Avro file-based data structures

UNIT-IV:

Map reduce applications

Map Reduce workflows , unit tests with MR Unit , test data and local tests – anatomy of Map Reduce job run , classic Map-reduce , YARN , failures in classic Map-reduce and YARN , job scheduling , shuffle and sort , task execution , MapReduce types , input formats , output formats

UNIT-V:

Hadoop related tools

Hbase,data model and implementations, Hbase clients ,Hbase examples – praxis. Cassandra ,cassandra data model , cassandra examples ,cassandra clients , Hadoop integration.Pig , Grunt , pig data model , Pig Latin , developing and testing PigLatin scripts. Hive , data types and file formats , HiveQL data definition , HiveQL data manipulation – HiveQL queries

TEXT BOOK:

1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of
3. Polyglot Persistence", Addison-Wesley Professional, 2012.
4. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.
5. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.
6. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012.
7. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011.
8. Eben Hewitt, "Cassandra: The Definitive Guide", O'Reilley, 2010.
9. Alan Gates, "Programming Pig", O'Reilley, 2011.

MCAE428(3): DISTRIBUTED DATABASE SYSTEM

UNIT-I

Transaction and schedules, Concurrent Execution of transaction, Conflict and View Serializability, Testing for Serializability, Concepts in Recoverable and Cascade less schedules.

UNIT –II

Lock based prtocols, time stamp based protocols, Multiple Granularity and Multi version Techniques, nforcing serializablity by Locks, Locking system with multiple lock modes, architecture for Locking scheduler

UNIT III

Distributed Transactions Management, Data Distribution, Fragmentation and Replication Techniques, Distributed Commit, Distributed Locking schemes, Long duration transactions, Moss Concurrency protocol.

UNIT –IV

Issues of Recovery and atomicity in Distributed Databases, Traditional recovery techniques, Log based recovery, Recovery with Concurrent Transactions, Recovery in Message passing systems, Checkpoints, Algorithms for recovery line, Concepts in Orphan and Inconsistent Messages.

UNIT V

Distributed Query Processing, Multiway Joins, Semi joins, Cost based query optimization for distributed database, Updating replicated data, protocols for Distributed Deadlock Detection, Eager and Lazy Replication Techniques

TEXT BOOK:

1. Silberschatz, Korth and Sudershan, Database System Concept', Mc Graw Hill
2. Ramakrishna and Gehrke,' Database Management System, Mc Graw Hill
3. Garcia-Molina, Ullman,Widom,' Database System Implementation' Pearson Education
4. Ceei and Pelagatti,'Distributed Database', TMH
5. Singhal and Shivratri, 'Advance Concepts in Operating Systems' MC Graw Hill

MCAI429: MULTIMEDIA SYSTEMS

UNIT-1

Introduction of Multimedia: Definition, Type of medium, Properties of multimedia system, Application of multimedia.

UNIT-2

Multimedia Hardware and Software Tools, input/output Hardware tools communication devices, Sound editing tools, Animation tools, image editing tools.

UNIT-3

Text: Using text in multimedia, computer and text, Hypertext and Hypermedia.

Image: Concept of image, bitmap, vector drawing images, colors, Types of colors, RGB function.

UNIT-4

Sound: Basics concept of sound, computer representation on sound, audio formats,

Music: MIDI concept, MIDI Devices, MIDISIWI, Speech, Analysis, difference between digital and MIDI

UNIT-5

Video and Animation: Analog V/s digital video, working of video standard, methods of controlling/display animations.

Reference Books

1. 1.Principles of interactive multimedia by Elsom—Cook
2. 2.Tay Vaugham "Multimedia making it work" Tata Mc Gruw Hill
3. 3.Sleinneitz, "Multimedia Systems Addison Wesley"
4. Multimedia Making It Work (TMH) 1997 : Tay Vaughan
5. Multimedia Power Tooks, 2 Edition : Peter Jerram and M. (Random House Electronic Publishing) Gosney