REGULATIONS

for

ADMISSION, SCHEME AND SYLLABI

for

INTEGRATED MCA

Five Year Integrated Degree Course in MCA leading to, Masters degree in Computer Application (MCA)

(With effect from 2017 admissions)

MAHATMA GANDHI UNIVERSITY
KOTTAYAM
KERALA

INDEX

REGULATIONS FOR INTEGRATED MASTER OF COMPUTER APPLICATIONS (IMCA) PROGRAMME

R1. CONDITIONS FOR ADMISSION

Qualifications

i) A candidate seeking admission to Integrated MCA course must have a pass with not less than 45% marks in 10+2 level with Physics and Mathematics in X standard along with one of the Chemistry/Biotechnology/Biology/Technical Vocational Subject/any stream in XII standard.

ii) Subject to the regulation relating to prescribed minimum of the respective qualifying examination, the minimum marks of Admission to the Course of studies shall be 40% in the case of candidates belonging to reserved category.

iii) Candidates belonging to Socially and Educationally Backward Classes (SEBC) referred to GO(P)208/66/Edn dated. 2-5-96 and subsequent amendments to order issued by the Government shall be given a relaxation of 3% marks in the prescribed minimum for admission and 5% for OEC.

iv) A relaxation of 5% marks from the prescribed minimum shall be allowed in the case of physically handicapped persons.

v) Reservation of seats shall be as per rules prescribed in the relevant rules by the Directorate of Technical Education, Government of Kerala / MG University.

R2. DURATION OF THE COURSE

The Course shall extend over a period of Five Academic years consisting of Ten Semesters.

R3. PROGRAMME COORDINATOR

To help the students in planning their Courses of study and for getting general advice on Academic programme, the concerned Department will assign a programme coordinator for IMCA programme under the Department. The programme coordinator will be the overall in charge in all matters concerning the students' work and progress.

R4. CURRICULUM

The Curriculum will comprise the Courses of study as given in the scheme in accordance with the prescribed syllabi.

Candidates will be required to undertake a suitable master's research project work and industrial training and mini project in consultation with the head of the Department and the faculty advisor and submit the project report and industrial training report there on at the end of the respective Semesters, on dates announced by the College/Department.

R5. REQUIREMENTS OF ATTENDANCE AND PROGRESS

i. A candidate will be deemed to have completed the requirements of study of any semester and permitted to appear each University **E**nd **S**emester **E**xaminations (ESE) only if,

   a) The candidate has kept not less than 75% of attendance in each semester of the total number of working days of the concerned semester.

   b) His/Her progress has been good.

   c) His/Her character and conduct has been good.

   d) He/She has minimum of 50 % of sessional marks for each subject.

ii. A student who has an attendance and sessional marks lower than 75% and 50% respectively will not be permitted to appear for the ESE and he/she has to redo the semester at the next available opportunity. However a candidate can repeat the course or have condonation of attendance or temporary break of study, only twice during entire programme.

Note: As these are academic mandatory prerequisites no exemption will be granted in these cases whatever may be the causes.

R6. PROCEDURE FOR COMPLETING COURSE

i. The Examinations of the odd semesters will be conducted only in odd semesters and that of the even semesters only in even semesters.

ii. A candidate may proceed to the course of study for the next semester only after completing the requirements of attendance and progress (Regulation clause R5) of the previous semester.

iii. A candidate is eligible for condonation of shortage of attendance only once in the entire programme subject to the conditions given below.

   a) His conduct and progress must be good as certified by the Principal.

   b) Condonation will be granted only on medical grounds if he/she has secured not less the 65% of attendance.

   c) By the recommendation of the head of the institution, the condonation shall be granted subject to rules and procedures prescribed by the University from time to time.

   d) It is open to Vice Chancellor to grant condonation of shortage of attendance on the recommendation of the head of the concerned institution.

iv. A student who is not eligible for condonation of shortage of attendance shall repeat the course in full including the sessional work in the next immediate chance. The sessional marks earned during repetition of course alone will be counted in such case.

v. A student can repeat the course only once in the entire course of study only on medical reasons (hospitalization / accident / specific illness). The hospitalization must be informed by the parent in writing with the certificate obtained from the Government Medical Officer

to the faculty in charge of programme coordination, Head of the Department and Principal within fifteen days of hospitalization.

vi. He/She shall repeat the course work in full (including sessionals) in a particular semester/year once and within 6 consecutive semesters.

vii. He/She shall not combine his course work with regular course work of any other semester.

viii. He/She shall not be allowed to repeat the course work of any semester if he/she has already passed that semester examination in full.

ix. A candidate who has been registered for the higher semester examination will not be allowed to repeat the course work, in lower semesters.

x. A candidate should complete up to six semesters before registering ninth semester.

R7. EXAMINATION AND VALUATION

a. Theory Examinations

There will be **e**nd **s**emester **U**niversity **e**xamination [**ESE**] at the end of each semester. There is no provision for improvement examinations.

To conduct all the theory examinations, a Chief Superintendent and an Assistant Chief Superintendent from senior faculty members are to be appointed by the Principal and approved by the University.

b. Practical Examinations

The Principals of colleges with the help of Chairmen/Chairperson should arrange the practical examination for all semesters with approval from the University.
Bonafide laboratory record / Master's project report / industrial training/ seminar report etc. are mandatory for appearing for the practical / viva-voce examinations.

To conduct practical examination, University will appoint an internal examiner from a panel of faculty (specialization in the relevant subject) of concerned college and an external examiner from other colleges. The external examiner will conduct the exam and decide the marks to be awarded to the candidates. The mark list filled and duly signed by the external examiner should forward to the chairman by the external examiner. The external examiner will be the custodian of the valued answer script till the commencement of subsequent examination. There is no provision for revaluation.

c. Valuation

i) The assessment will comprise of sessional assessment and University examination in certain subjects, and wholly sessional assessments in others, carrying marks as specified in the subject of study and scheme of assessment.

ii) A candidate shall be declared to have passed in any subject in full in any semester if he/she secures not less than 50% marks in sessional, not less than 40% marks in the University Examination including Project and Viva and not less than 50% of the overall aggregate marks for the subject ie., University Examination marks and sessional marks of

the subjects put together.

iii) There will be no provision to improve the sessional marks of any semester unless he repeats the semester.

vi) University Examinations will be conducted at the end of each semester for subjects offered during the semester.

v) Semester examinations will normally be conducted in October/November and in April/May of each year.

vi) All sessional work shall be valued and marks awarded on the basis of day to day performance, periodic tests and assignments. The allocation of sessional marks for individual subjects shall be on the following basis.

Theory Subjects		**Practicals**	
Attendance	10%	Attendance	10%
Assignments /Seminar	30%	Regular class work / Lab record / Class Performance	50%
Tests	60%	Tests	40%
Total	100%	Total	100%

The sessional marks allotted for attendance shall be awarded in direct proportion to the percentage of attendance secured by the candidate in the subject. However, full sessional marks for attendance shall be awarded to those who are securing 80% of the attendance and above.

R8. UNIVERSITY EXAM QUESTION PAPER PATTERN

The pattern shall comprise of 2 parts: PART A (10 x 3=30 marks) and PART B (5 x 9=45 marks). **Part A** shall have 30 marks, in which the student is expected to answer 10 short questions (3 marks each) out of 12 questions evenly prepared from all the five modules. These questions can consist of definitions, theoretical concepts, short illustrative examples, block schematics etc. **Part B** shall have 2 questions from each module, out of which the student has to answer one from each module (9 marks). These can be descriptive type questions, derivations, problems or collection of 2 or more smaller questions in a topic. This offers 50% choice to the students, yet forces him to study all the five modules.

R9. PASSING REQUIREMENTS AND PROVISIONS

i. All Credits should be earned by a candidate to be qualified for the MCA.

ii. The candidate should have cleared all dues to the Institute/University.

iii. No disciplinary action is pending against him/her.

iv. A candidate shall be declared to have passed in any subject in full in any semester if he/she secures not less than 50% marks in sessional, not less than 40% marks in the University Examination including Project and Viva and not less than 50% of the overall aggregate marks for the subject ie., University Examination marks and sessional marks of the subjects put together.

v. A candidate, who is absent or secures a grade F or less than 40% in ESE in any subject carrying sessional marks and ESE marks, will retain the already secured sessional marks for subsequent supplementary appearance in the examination of that subject.

vi. A candidate who fails to submit the report on the project/industrial training within the prescribed date (or whose report is not accepted for reasons of incompleteness or other serious deficiencies) will have to register, redo the project / industrial training and submit the report at the end of a subsequent semester.

vii. A candidate who successfully completes the Course satisfying all the passing requirements of the courses will be declared to be qualified for the award of MCA.

viii. Candidates who have passed all subjects of the Ten semesters at the first opportunity within Ten consecutive chances after the commencement of his/her study shall be ranked based on the CGPA obtained. In the case of a tie in the CGPA the total theory marks of the students who have secured same CGPA shall be considered for finalizing the rank.

ix. A candidate who qualifies for the award of IMCA degree having passed all the subjects of all the Ten Semesters within a period of maximum Ten consecutive semesters after the commencement of his/her study and secures a CGPA of 8 and above considering all the Ten semesters, will be declared to have passed the MCA degree in FIRST CLASS with DISTINCTION.

x. A candidate who qualifies for the award of IMCA degree having passed all the subjects of all the Ten semesters within a period of maximum Ten consecutive semesters after the commencement of his/her study and secures a CGPA of 6.75 and above considering all the Ten semesters will be declared to have passed the MCA degree in FIRST CLASS.

xi. All other successful candidates will be declared to have passed the MCA degree in SECOND CLASS.

xii. In the case of a student (regular / repeated /temporary break study) who has taken a **supplementary** chance for passing a subject, only **minimum pass grade** (E) will be **considered** in that subject for all classification purpose.

xiii. Candidates shall be declared to have qualified for the award of the MCA degree provided the Candidate has successfully completed the course requirements and has passed all the prescribed subjects of study in the ten semesters within a maximum period of seven years from the commencement of his/her study.

xiv. Every candidate shall, based on his/her project work/dissertation, send a paper for publication in journal or a conference in which all papers are published after usual

review.

xv. **Minimum for a pass**

a. A candidate shall be declared to have passed a semester examination in full in the first appearance if he/she secures not less than 6 CGPA with a minimum of 'E' grade for the all individual subject in that semester.

b. A candidate shall be declared to have passed in an individual subject of a semester examination if he/she secures grade 'E' or above.

c. A candidate who does not secure a full pass in a semester examination as per clause (a) above will have to pass in all the subjects of the semester examination as per clause (b) above before he is declared to have passed in that semester examination in full.

R10. SCHEME OF EVALUATION

a. Credit System

Each subject shall have a certain number of credits assigned to it depending upon the academic load and the nature and importance of the subject. The credit associated with each subject will be shown in the prescribed scheme and syllabi. Each course shall have an integer number of credits, which reflects its weightage.

b. Grading

The University shall award the letter grade to students based on the marks secured by them in both internal assessment and semester end examinations taken together in the subjects registered. Each letter grade indicates a qualitative assessment of the student's performance and is associated with a specified number of grade points. The grading system along with the grade points for each grade, applicable to passed candidates is shown below. All passed candidate will be allotted a grade S, A, B, C, D, E, and F according to the total marks scored by him/her.

There will be a continuous evaluation system. Various components of evaluation are Teachers' Assessment (TA), Class Tests (CT) and University end semester examination (ESE). To make the evaluation more effective, teachers' assessment could be broken into various components like assignments, quizzes, attendance, group discussions, tutorials, seminars, field visit reports etc. These two components i.e., TA & CT put together will form the sessional components. End semester examination will be conducted by the institution through concerned affiliating University, as per its rules and regulations.

On the basis total marks (TA+CT+ESE) for each subject obtained, a letter grade should be awarded, where S = 10, A = 9, B = 8, C = 7, D = 6, E = 5, F = 0. "F" denotes failure in the course.

All letter grades except 'F' will be awarded if the marks for the University examination is 40 % or above and the total mark (TA+CT+ESE) is 50 % or above. No absolute mark will be indicated in the grade card. Letter grade corresponding to total marks (TA+CT+ESE) and the

corresponding grade point in a ten point scale is described below.

Range of % of total marks	Letter grade	Grade point
90 to 100	S	10
80 to 89	A	9
70 to 79	B	8
60 to 69	C	7
55 to 59	D	6
50 to 54	E	5
0 to 49	F	0

c. Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

Semester Grade Point Average is the semester wise average points obtained by each student in a ten point scale. SGPA for a particular semester is calculated as per the formula shown below.

$$SGPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$$

Where, n is the number of subjects registered during the semester, C_i is the number of credits allotted to i^{th} subject as per the scheme, and G_i is the grade points corresponding to the grade awarded to the student for the subject.

d. Cumulative Grade Point Average (CGPA) shall be computed for all the students at the end of each semester by taking into consideration their performance in the present and the past semesters as follows:

$$CGPA = \frac{\sum_{i=1}^{m} C_i G_i}{\sum_{m}}$$

$$\sum_{i=1}^{C_i}$$

Where, m is the number of courses registered up to that semester, C_i is the number of credits allotted to i^{th} subject as per the scheme, and G_i is the grade points corresponding to the grade awarded to the student for the subject.

SGPA and CGPA shall be rounded to two decimal points.

e. Grade Card

The grade card issued to the students shall contain course number and subject name, credits for the subject, letter grades obtained, SGPA for the semester and CGPA up to that particular semester. In addition to the grade cards for each semester all successful candidate shall also be issued a consolidated statement grades. On specific request from a candidate and after remitting the prescribed fees the University shall issue detailed marks to the individual candidate.

R11. REVISION OF REGULATIONS

Notwithstanding all that has been stated above, the University has the right to modify any of the Regulations, Scheme of Studies, Examinations and Syllabi from time to time.

SEMESTER I

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA101	English	4	-	-	25	75	100	4
2	IMCA102	Computer Organization & Architecture	4	1	-	25	75	100	4
3	IMCA103	Statistics-I	4	-	-	25	75	100	4
4	IMCA104	Introduction to Computers & PC hardware	4	-	-	25	75	100	4
5	IMCA105	Programming Methodology & C Programming	4	1	-	25	75	100	4
6	IMCA106	PC hardware Practicals- Office documents	-	-	4	25	75	100	2
7	IMCA107	C Practicals	-	-	4	25	75	100	2
Total			20	2	8	-	-	700	24

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER II

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA201	Technical Communication	4	-	-	25	75	100	4
2	IMCA202	Statistics- II	4	-	-	25	75	100	4
3	IMCA203	Digital Systems & Logic Designs	4	-	-	25	75	100	4
4	IMCA204	Data Structures- C	4	1	-	25	75	100	4
5	IMCA205	Object Oriented Programming with C++	4	1	-	25	75	100	4
6	IMCA206	Data Structures Practicals in C	-	-	4	25	75	100	2
7	IMCA207	C ++Lab	-	-	4	25	75	100	2
Total			20	2	8	-	-	700	24

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER III

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA301	Mathematical Foundation of Computer Science	4	-	-	25	75	100	4
2	IMCA302	Operating Systems	4	-	-	25	75	100	4
3	IMCA303	Data Base Management Systems	4	1	-	25	75	100	4
4	IMCA304	Multimedia Systems	4	-	-	25	75	100	4
5	IMCA305	Visual Programming(VB.NET)	4	1	-	25	75	100	4
6	IMCA306	Microprocessors	4	-	-	25	75	100	4
7	IMCA307	Visual Programming Practicals	-	-	4	25	75	100	2
Total			24	2	4	-	-	700	26

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER IV

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA401	Artificial Intelligence	4	1	-	25	75	100	4
2	IMCA402	Cryptography and Network Security	4	1	-	25	75	100	4
3	IMCA403	Elective I	4	-	-	25	75	100	4
4	IMCA404	Data Communications	4	-	-	25	75	100	4
5	IMCA405	Management Information Systems	4	-	-	25	75	100	4
6	IMCA406	DBMS Practicals	-	-	4	25	75	100	2
7	IMCA407	Microprocessors Practicals	-	-	4	25	75	100	2
Total			20	2	8	-	-	700	24

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER V

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA501	Operations Research	4	-	-	25	75	100	4
2	IMCA502	Compiler Design	4	1	-	25	75	100	4
3	IMCA503	Distributed Computing	4	1	-	25	75	100	4
4	IMCA504	Computer Networks	4	-	-	25	75	100	4
5	IMCA505	Software Engineering	4	-	-	25	75	100	4
6	IMCA506	Compiler Design Practicals	-	-	4	25	75	100	2
7	IMCA507	Cloud Computing Practicals	-	-	4	25	75	100	2
Total			20	2	8	-	-	700	24

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER VI

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA601	Research Methodology	4	-	-	25	75	100	4
2	IMCA602	IT Infrastructure Management	4	-	-	25	75	100	4
3	IMCA603	**Elective II**	4	-	-	25	75	100	4
4	IMCA604	Seminar- I	-	-	2	25	75	100	2
5	IMCA605	Software Development- Project I	-	-	4	25	75	100	4
Total			12	-	6	-	-	500	18

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER VII

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA701	Principles of Management & Accounting	4	-	-	25	75	100	4
2	IMCA702	Analysis & Design of Algorithms	4	-	-	25	75	100	4
3	IMCA703	Object Oriented Programming through Java	4	1	-	25	75	100	4
4	IMCA704	Software Engineering & Project Management	4	1	-	25	75	100	4
5	IMCA705	OOAD	4	-	-	25	75	100	4
6	IMCA706	PHP Programming Practicals	-	-	4	25	75	100	2
7	IMCA707	OOPS through Java Practicals	-	-	4	25	75	100	2
Total			20	2	8	-	-	700	24

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER VIII

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA801	System Software And Automata	4	-	-	25	75	100	4
2	IMCA802	Data Mining & Warehousing	4	-	-	25	75	100	4
3	IMCA803	TCP/IP Protocols	4	1	-	25	75	100	4
4	IMCA804	Linux OS and Shell programming	4	1	-	25	75	100	4
5	IMCA805	**Elective III**	4	-	-	25	75	100	4
6	IMCA806	Linux OS & Shell programming Practicals	-	-	4	25	75	100	2
7	IMCA807	Mini Project - Application Development	-	-	4	25	75	100	2
Total			20	2	8	-	-	700	24

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER IX

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCA901	User Interface Design	4	-	-	25	75	100	4
2	IMCA902	Knowledge Management & Applications	4	1	-	25	75	100	4
3	IMCA903	Enterprise Resource Planning	4	1	-	25	75	100	4
4	IMCA904	Mobile Application Development – Adv Java	4	-	-	25	75	100	4
5	IMCA905	**Elective IV**	4	-	-	25	75	100	4
6	IMCA906	Mobile Application Development – Practicals	-	-	4	25	75	100	2
7	IMCA907	Python Programming – Practicals	-	-	4	25	75	100	2
8	IMCA908	Main Seminar – Current Trends				50		50	
Total			20	2	8	-	-	750	24

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

SEMESTER X

Sl no	Course code	Subject	Hours / week			Sessional	ESE	Total	Credits
			L	T/P	P				
1	IMCAX01	Main Project- Application Development	-	-	-	150	100	250	8
2	IMCAX02	Viva-Voce	-	-	-	50	100	150	4
Total			-	-	-	-	-	400	12

L-Lecture T-Tutorial P-Practical ESE-End Semester Examination

LIST OF ELECTIVES (ANY 1 FROM THE FOLLOWING LIST)

Elective I – Semester IV

1. E-Commerce
2. Client Server Computing
3. Bio informatics

Elective II – Semester VI

1. Android Programming
2. Distributed Processing
3. Internet Technology And Applications
4. Embeded System Design

Elective III – Semester VIII

1. Microprocessor and Embedded Systems
2. Big Data Analytics
3. Distributed Operating Systems
4. Cloud and Grid Computing
5. Social Network Analysis
6. Cryptography and Computer Security
7. Soft Computing

Elective IV – Semester IX

1. Ad-hoc & Sensor Networks
2. Multimedia Systems
3. Information Security & E-Commerce
4. Digital Image Processing
5. Distributed Computing
6. Middle- Ware Technologies
7. Computer Graphics with Open GL

Semester I

IMCA101 ENGLISH

MODULE - I

Speech Sounds: Phonemic symbols - Vowels - Consonants - Syllables - Word stress - Stress in polysyllabic words - Stress in words used as different parts of speech - Sentence stress - Weak forms and strong forms - Intonation - Awareness of different accents: American, British and Indian - Influence of the mother tongue

MODULE - II

Listening: Active listening - Barriers to listening - Listening and note taking- Listening to announcements - Listening to news on the radio and television

MODULE- III

Speaking: Word stress and rhythm - Pauses and sense groups - Falling and rising tones - Fluency and pace of delivery - Art of small talk - Participating in conversations - Making a short formal speech - Describing people, place, events and things - Group discussion skills and telephone skills

MODULE - IV

Reading: Reading: theory and Practice - Scanning - Surveying a textbook using an index - reading with a purpose - making predictions - Understanding text structure - Locating main points - Making inferences - Reading graphics - reading critically - Reading for research

TEXT BOOKS

1) V.Sasikumar, P Kiranmai Dutt and Geetha Rajeevan, Communication Skills in English. Cambridge University Press and Mahatma Gandhi University.
2) Sasikumar V, Kiranmai Dutt and Geetha Rajeevan, Acourse in listening and speaking I & II
3) Tony Lynch, study Listening: A course in Listening to lectures and note-taking
4) Anderson Kenneth, Joan Maclean, Study speaking: A Course in Spoken English for Academic Purposes
5) Glendinning, Eric and Beverly Holmstrom, Study Reading: A Course in Reading Skills for Academic Purposes, New Delhi, CUP, 2008
6) Sky Massan, Communication Studies, Palgrave Macmillan
7) Joan Van Emden and Lucinda Becker, effective Communication for Arts and Humanities Students, Palgrave Macmillan

IMCA 102 COMPUTER ORGANIZATION & ARCHITECTURE

Module I

Introduction: Basic structure of computers-Machine Instructions and programs: Memory Locations and addresses, Memory Operations, Instructions and Instruction sequencing, Addressing modes, Basic Input Output Operations, Subroutines.

Module II

Central Processing Unit: Arithmetic & Logic Unit: Number Representation – Addition of positive numbers – Fast Adders – Signed Addition and Subtraction – Multiplication of positive numbers – Multiplication using Booth's algorithm - Fast Multiplication – Floating point numbers and Operations. The Processing Unit: Basic Concepts - Instruction execution cycle - sequencing of control signals - hardwired control - microprogrammed control - control signals - microinstructions- microprogram sequencing - Branch address modification- Pre fetching of microinstructions

Module III

The Main Memory: Memory Hierarchy – Main memory - RAM-ROM – Cache Memory – Performance Considerations -Virtual Memory-Memory Management Requirements, Secondary storage – memory interleaving.

Module IV

Input / Output Organization: Accessing I/O devices - Interrupts: Interrupt processing – hardware interrupts –programmable interrupt controller – Vectored Interrupts - Interrupt nesting - Daisy chaining - Direct memory access (DMA): DMA operations & DMA Controller – Buses – Introduction to I/O interfaces.

Module V

Parallel processing : Basic Parallel Processing Architecture - Flynn‟s Classification - SISD, MISD, SIMD, MIMD structures - Pipelining – Basic Concepts of pipelining, Instruction Pipelining, Hazards, Vector processing & Vector processors - Loosely Coupled & Tightly Coupled Systems - Instruction-level parallelism: Concepts of instruction-level parallelism (ILP), Superscalar, Super pipelined and VLIW processor architectures - Comparison of RISC and CISC.

References

1) Computer Organization, V C Hamacher, Mc-Graw Hill International Edition, Fifth Edition.
2) Computer Architecture: A Quantitative Approach - John Hennessy and David Patterson,
3) Morgan Kaufmann Publishers Inc., Third Edition
4) Computer System Architecture – M Morris Mano –(Prentice Hall)- Third Edition.
5) Computer Organization and Architecture- William Stallings - Fifth Edition.
6) Structured Computer Education – Andrew S Tanenbaum-(Prentice Hall)-Fourth Edition.
7) Computer Organization and Architecture- William Stallings - Fifth Edition.
8) Structured Computer Education – Andrew S Tanenbaum-(Prentice Hall)-Fourth Edition.

IMCA 103- STATISTICS I

Module I:- Scope and Limitations of Statistics

Introduction, Limitations of Statistics, Misuse of Statistics, Collection of data- primary and secondary data, collection of primary data, Classification and tabulation-methods of classification and tabulation

Module II:-Diagrams and Graphs

Pictorial representation of data, Representation of categorical data, Graphs of frequency distribution, ogives and uses of ogives

Module III:-Measures of central tendency and Dispersion

Definition of central tendency, Measures- Mean, Median, Mode, Geometric Mean , Harmonic Mean. Dispersion –Introduction, Absolute and relative measures of dispersion-Range, Inter-quartile range, quartile deviation, mean deviation and standard deviation

Module IV:- Skewness, Moments and Kurtosis

Definition and types of Skewness, Measures of Skewness-Karl pearson's coefficient of skewness, Bowley's coefficient of skewness, Kelly's measure of skewness. Moments- raw and central moments. Kurtosis

Module V:- Correlation and Regression

Correlation- Meaning and definition, types of correlation, Karl Pearson's coefficient of correlation, Rank correlation. Regression- Meaning and definition, types of regression, lines of regression.

References

1) Fundamentals of statistics: S.C.Gupta,6thRevised and enlarged edition-April 2004, Himalaya Publications.

2) Introduction to Probability and Statistics, Medenhall, Thomson Learning , 12 Edn.\

3) B.L. Agarwal: Basic Statistics, New Age International (p) Ltd.

4) Murthy M.N.: Sampling theory and Methods, Statistical Publishing Society, Calcutta

IMCA 104- INTRODUCTION TO COMPUTERS AND PC HARDWARE

Module I

Basic Components of a Computer, History, Types of computers. I/O devices: Input and Output devices, Printers-Different types of Printers, Display Devices, Scanners.

Module II

CPU & Memory – CPU, ALU, Control Unit & Registers, RAM, Variants of RAM, ROM, Variants of ROM, Physical Memory organization: DIP, SIMM, DIMM, SIPP.

Module III

Introduction, Getting started withPC hardware support, Operating systems, CPUs and motherboards, Basic Input/Output System, Memory systems, Bus structures, Expansion cards, Ports, connectors, and cables, Data storage devices, Video and multimedia input/output devices,

Module IV

Hard Disk**: Hard** disk drive components, disk platter, read/ write head, head arm/ head slider, spindle motor, logic board, air filter, head actuator mechanism. Disk Geometry: Sides or heads, track, cylinder, sector, Disk Recording: Data recording method, writing on reading from a magnetic disk, interleave, skew. Hard Disk Interfacing: Concepts of Interfacing Formatting: Low level and high level.

Module V

Mother Board: CPU socket, Memory and secondary Cache sockets or chips, ROMBIOS and BIOS CMOS, Universal serial bus. Secondary Storage Devices: Floppy disk, CD Family, DVD, ZIP Drive**.** Trouble shooting and PCMaintanance.

References

1) The Complete Reference – PC Hardware – Craig Zacker & John rourke, Edition 2001 Tata McGraw Hill

2) All About Hard Disk, Manohar Lotia

3) All About Motherboard, Manohar Lotia

4) PC Hardware – A Beginners Guide , Rongilster , 2001

IMCA 105 PROGRAMMING METHODOLOGY & C PROGRAMMING

Module I

Introduction to algorithm, flowchart, structured programming concept, programs – Compiler, Interpreter. Introduction to C Language: The C character set, identifiers and keywords, data types, how floats and doubles are stored, constants, variables and arrays, declarations, expressions, statements, Lvalues and Rvalues , type conversion, symbolic constants.

Module II

Operators and expressions: Arithmetic operators, unary operator, relational and logical operator, assignment operators, the conditional operator, type conversion, Library function, Data input and output: Single character input, single character output, scanf, printf, puts gets functions, interactive programming. Control statement: Branching: if else statement, Looping, nested control structure, switch statement, break statement, continue statement, comma operator, goto statement.

Module III

Functions: Overview, function prototypes, passing arguments to a function, recursion. Program structure: Storage classes, automatic variables, external variables, static variables, multifile program. Arrays: Defining an array, passing array to functions, multidimensional arrays, strings: one dimensional character array, array of strings.

Module IV

Pointers: Fundamentals, void pointer, null pointer, passing pointers to a function, pointers and one dimensional arrays, dynamic memory allocation, operation on pointers, pointers and multidimensional arrays, array of pointers, pointer to an array, pointers and strings, structure pointer, pointers to function, pointers and variable length arguments list, passing functions to other functions. Structures and unions: Defining a structure, processing a structure, user defined data types, structure and pointers, passing structure to function, self-referential structures, and union.

Module V

Data files: Why files, opening and closing a data file, reading and writing a data file, processing a data file, unformatted data file, concept of binary file. Low level programming: Register variable, bitwise operations, bit fields. Additional features of C: Enumeration, Command line parameters, Macros, C Preprocessor.

References

1) The c programming language – Brian W Kernighan & Dennis Ritchie IInd edition Eastern Economy Edition, Prentice Hall 2001
2) Programming with C – Byron S Gottfried– Schaum‟s outlines 2nd Edition,2010
3) Computer Science: A Structured Programming Approach Using C, Forouzan, 3rd Cengage Learning 2007

4) C – How to Program, Deitel & Deitel, Pearson Education Asia, 6th Edition,2009
5) Programming in C –Pradip Dey, Manas Ghosh – Oxford Higher Education ,2007
6) Ansi C programming Bronson, Cengage learning, C2009
7) Understanding pointers in C- Yashavant Kanetkar – BPB publication , 2009
8) Let us C - Yashavant Kanetkar – BPB publication C. 1997
9) C by discovery – l s Foster – Pearson C 2005
10) Working with C - Yashavant Kanetkar – BPB publication,2008
11) Instant C program – Ivor Horton – Wrox, 1995
12) The art of programming computer science with „C" – Steven c Lawlor – Wess , Cengage C2006

IMCA 106 – (PC HARDWARE PRACTICALS)

1. Identification of PC Components and Assembling the PC
2. Understanding BIOS set up-
3. Installation of Operating Systems-
4. Installation of Software Packages
5. Replacing and fitting of Hard Disk and Removable Disk Drives on PC
6. Identification of different cards in the PC
7. Disc Managers and it's use
8. Virus removal and disc scan
9. Backup and Restoration utility
10. Connecting input/output devices and installation of their driver softwares.
11. Configuration of Audio and Video
12. Trouble shooting of the PC
13. Ms office –Word, Excel, Powerpoint and Access

References

1) The Complete Reference – PC Hardware – Craig Zacker & John rourke, Edition 2001 Tata McGraw Hill

IMCA 107 (C PROGRAMMING PRACTICALS)

Section A

- Implementation of the various Data Types in C.
- Demonstration of Data type conversion (Hint: Usage of type casting).
- Implementation of various Storage Types.
- Demonstration of for loop.
- Demonstration of do...while loop.
- Demonstration of while loop.
- Demonstration of nested if (Hint: Use logical operators).
- Demonstration of switch... case structure.
- Implementation of arrays.
- Implementation of multidimensional arrays (Hint: implement matrix operation).
- Implementation of functions (Hint: Demonstrate call by value, call by schemes, passing of arrays).
- Demonstration of various string operations (Hint: Usage of user defined functions only allowed).
- Demonstration of pointer operations.
- Demonstration of recursion (Hint: GCD, factorial, Fibonacci series).
- Demonstration of Debugging a C program.

Section B

- Implementation of structures (Hint: simple structure operations, array of structures).
- Implementation of Union.
- Implementation of pointers to structures and unions.
- Demonstration of dynamic allocation of memory (Hint: malloc, calloc, realloc, free).
- Demonstration of sorting techniques (Hint: selection sort, bubble sort).
- Demonstration of searching techniques (Hint: linear search, binary search).
- Demonstration of bitwise operations.
- Demonstration of macro processing.
- Demonstration of various file operations. (Hint: Text file)
- Implementation of character counting, line counting and word counting for a file.
- Program to find the lengthiest line in a text file.

Semester II

IMCA 201 TECHNICAL COMMUNICATION

Module I

Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); **Speaking -** Speaking about one‟s place, important festivals etc. – Introducing oneself, one‟s family / friend; **Reading -** Skimming a reading passage – Scanning for specific information - Note-making; **Writing -** Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one‟s leisure time activities, hometown, etc.); **Grammar -** Prepositions - Reference words - Wh-questions - Tenses (Simple); **Vocabulary -** Word formation - Word expansion (root words / etymology); **E-materials -** Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

Module II

Listening - Listening and responding to video lectures / talks**; Speaking -** Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette; **Reading –** Critical reading - Finding key information in a given text - Sifting facts from opinions**; Writing -** Biographical writing (place, people) - Lab descriptions (general/specific description of laboratory experiments) - Definitions - Recommendations; **Grammar -** Use of imperatives - Subject-verb agreement**; Vocabulary -** Compound words - Word Association**; E-materials -** Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

Module III

Listening - Listening to specific task - focused audio tracks; **Speaking -** Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners); **Reading -** Reading and interpreting visual material**; Writing -** Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause & effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing**; Grammar -** Tenses (Past) - Use of sequence words - Adjectives**; Vocabulary -** Different forms and uses of words, Cause and effect words**; E-materials -** Interactive exercises for Grammar and Vocabulary - Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations.

Module IV

Listening - Watching videos / documentaries and responding to questions based on them**; Speaking -** Responding to questions - Different forms of interviews - Speaking at different types of interviews; **Reading -** Making inference from the reading passage - Predicting the content of a reading passage; **Writing -** Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays**; Grammar -** Adverbs **–** Tenses – future time reference; **Vocabulary -** Single word substitutes - Use of abbreviations & acronyms**; E-materials -** Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

Module V

Listening - Listening to different accents, Listening to Speeches / Presentations, Listening to broadcast & telecast from Radio & TV**; Speaking -** Giving impromptu talks, Making presentations on given topics**; Reading -** Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email **Writing -** Creative writing, Poster making**; Grammar -** Direct and indirect speech**; Vocabulary -** Lexical items (fixed / semi fixed expressions); **E-materials -** Interactive exercises for Grammar & Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters

References:

1) Mindscapes: English for Technologists and Engineers, Department of English, Anna University, Chennai, 2012 .
2) S.P.Dhanavel, English and Communication skills for students of science and Engineering, Orient Black Swan, Chennai, 2011.
3) Pickett, Nell Ann, Ann A.Laster and Katherine E.Staples. **Technical English: Writing, Reading and Speaking.** New York: Longman, 2001.
4) Bailey, Stephen. **Academic Writing: A practical guide for students.** New York: Rutledge, 2011.
5) Morgan, David and Nicholas Regan**. Take-Off: Technical English for Engineering.** Reading: Garnet Publishing Limited, 2008.
6) Thorn, Michael and Alan Badrick. **An Introduction to Technical English.** Harlow**:** Prentice Hall Europe, 1993.
7) Rizvi, M.Ashraf. **Effective Technical Communication.** New Delhi: Tata McGraw-Hill Publishing Company, 2007.

IMCA 202 STATISTICS II

Module I:- Probability Theory

Introduction, Sample space, Events, Different approaches to probability, Addition and multiplication theorems on probability, Independent events, conditional probability, Bayes theorem

Module II:-Random Variables and Mathematical Expectations

Random Variables , probability functions and distribution functions, marginal density functions, joint density functions

Mathematical Expectation- Definition, elementary properties of expectation, Moments-Raw and central moments, Mean ,Variance and Co variance, Moment generating function, characteristic functions

Module III:-Standard distributions

Discrete probability distributions-Uniform distribution, Binomial distribution, Poisson distribution, Geometric distribution, Exponential distribution

Continuous probability distributions-Uniform distribution and Normal distribution

Module IV:- Sampling and Estimation

Theory of Sampling-population and sample, Types of sampling

Theory of Estimation-Introduction, point estimation, methods of point estimation-maximum Likelihood estimation and method of moments, Central Limit theorem (statement only)

Module V:- Testing of Hypothesis

Null and alternative hypothesis, types of errors, level of significance, critical region, large sample Tests-Testing of hypothesis concerning mean of a population and equality of means of two populations. Small sample tests-t Test for single mean, difference of means, Paired t-test, Chi-square test, F test-test for equality of two population variances

References

Fundamentals of statistics: S.C.Gupta,6thRevised and enlarged edition-April 2004, Himalaya Publications.
Fundamentals of Mathematical Statistics- S.C.Gupta ,V.K.Kapoor. Sultan Chand Publications.
Introduction to Mathematical Statistics -Robert V. Hogg &Allen T. Craig. Pearson education. 12 Edn.
Probability and Statistics – Schaums outline series

IMCA 203 DIGITAL SYSTEMS & LOGIC DESIGN

Module1 - Number systems and code.
Number systems - Efficiency of number system, Decimal, Binary, Octal, Hexadecimal conversion from one to another- Binary addition, subtraction, multiplication and division, representation of signed numbers, addition and subtraction using 2's complement and I's complement. **Binary codes -** BCD code, Excess 3 code, Gray code, Alphanumeric code, Error detection codes, Error correcting code.

Module II - Logic Gates and Boolean Algebra.
Logic Gates - Basic logic gates- AND, OR, NOT, NAND, NOR, Exclusive OR, Exclusive NOR gates- Logic symbols, truth table and timing diagrams. **Boolean Algebra** - Basic laws and theorems, Boolean functions, truth table, minimization of boolean function using K map method, Realization using logic gates and universal gates.

Module III - Combinational and Sequential Logic Circuits.
Combinational circuits - Half adder, Full Adder, Parallel binary adder, Subtracter, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers, Parity bit generator, PLA. **Sequential circuits** - Flip Flops – RS, JK, T and D Flip Flops, Edge triggered Flip Flops, Master slave Flip Flops.

Module IV - Registers and counters.
Registers - Serial in serial out, Serial in Parallel out, Parallel in serial out, Parallel in Parallel out registers, Bidirectional shift registers, universal shift registers. **Counters -** Synchronous and asynchronous counters, UP/DOWN counters, Modulo-N Counters, Cascaded counter, Programmable counter, Counters using shift registers, application of counters.

Module V - Introduction to computers.
Basic components of a computer , I/O devices - Input and output devices, printers, Display devices, Scanners. Mother Board - components of mother board. Secondary storage devices - Hard disk- components of hard disk, data storage in hard disk, disk geometry.CD Family, DVD.

References

1) Digital logic and Computer design - Morris Mano, Prentice Hall of India,2004.
2) Digital Fundamentals - Floyd, Pearson Education, 2009.
3) All about Hard Disk- Manohar Lotia, BPB Publications.
4) Digital principles and Applications- Albert Paul Malvino, Donald P Leach, McGraw Hill
5) All about Mother Board- Manohar Lotia, 2002.
6) Digital computer Fundamentals - Thomas C Bartee, McGraw Hill.
7) The Complete Reference PC Hardware – Craig Zacker, John Rourke, Tata McGraw-Hill, 2004.

IMCA 204 DATA STRUCTURES-C

Module I
Introduction: Algorithmic notation, Introduction to algorithm analysis for time and space requirements. **Arrays**: Ordered lists – polynomial addition, sparse matrices, representation of array.

Module II
Linked List: Singly linked list, Linked stacks and queues, Polynomial addition, Equivalence relation, sparse matrices, doubly linked list and dynamic storage management, Garbage collection and compaction. Strings – data representation for strings, Pattern matching in strings,

Module III
Stacks and Queues: Definition and concepts, Operations on stacks. Application of stacks-recursion, polish expressions and their compilation, queue, representation of queue, circular queue, deque, priority queue, Application of queues, Linked stacks and queues.

Module IV

Trees: Basic terminology, binary trees, binary tree representation, Binary tree traversal, threaded binary trees, binary tree representation of trees, Application of trees – Set representation, Balanced Trees-B,B+. **Graphs**: Terminology and representation, Traversals, Connected components and AVL.

Module V

Internal Sorting and External Sorting: Searching – Linear search, binary search, Fibonacci and interpolation search. Comparison of different methods. Sorting – Insertion, Bubble, Selection, Quick, heap, Radix sort, Merge sort comparison. Sorting with disks - K way merging, Run generation. **Hashing Techniques**: Different hashing functions, methods for collision handling

References:

1) Fundamentals of data structures – Ellis Horowitz and Sartaj Sahni (Galgotia)
2) An introduction to data structures with applications – Jean Paul Tremblay, paul G Sorenson(Tata McGraw Hill)
3) Data Structures – E.M Reingald , W Hamen (CBS Publishers and distributors)
4) Data Structures – a psedocode approach with C –Richard F Gilberg, Behrouz A Forouzan, Thomson Learning, 2 Edn.
5) Data Structures and program design – R. L Kruse (Prentice Hall of India)
6) Data structures using C – Tanenbaum and Augustine (Prentice Hall of India)
7) Theory and problems of data structures – Seymour lipschutz (Tata McGraw Hill)
8) Data structures and Algorithms in C++, Adam Drozdek, Thomson Learning, 3 Edn
9) Classic data structures – D Samanta (PHI)

IMCA 205 OBJECT ORIENTED PROGRAMMING WITH C++

Module I

Introduction to Object-Oriented Programming: Evolution of programming methodologies. Procedural Approach Vs Object-Oriented Approach. Encapsulation and Abstraction, Message Passing, Inheritance, Reusability, Extensibility, Polymorphism, Overloading.

Objects and Classes: Access Specifiers. Memory Allocation for Objects, Friend Functions and Friend Classes, Static Data Members; Static Member Functions. this pointer. Comparison of class with structure. Inline functions.

Arrays and Strings: Arrays Within a Class; Arrays of Objects; Objects as Function Arguments; Returning Objects; const Member Functions; Constructing Two-Dimensional Arrays. String Manipulation using objects

Module II

Constructors and Destructors: Purpose of Constructors and Destructors. Default Constructors, Constructors with & without parameters, Constructor Overloading, Copy Constructor. Invoking Constructors and Destructors.

Pointers in C++ : Pointer declaration and Access, Pointer to void, pointer and arrays, pointer to pointer, pointer to functions, call by pointer, pointer arrays, Jagged array, array of pointers to string, memory management – new and delete, pointer to object. self referencing class, wild pointers.

Module III

Polymorphism: Overloading Concepts, Function Overloading: Operator Overloading: Defining Operator Function, Rules for overloading Operators. Overloading unary operators, overloading binary operators, Overloading Comma, [], (), ->, new, delete Operators. Type Conversions – Basic to Class, Class to Basic and One class to another class type, Advanced Type Casting.

Module IV

Inheritance: Basic Concepts, Reusability & Extensibility. Defining derived classes, protected access specified in Base class constructors and destructors in derived classes – Types of Inheritances. Making a Private Member Inheritable; Member Classes: Nesting of Classes.

Virtual Functions: Virtual Base Classes, Normal member functions accessed with pointers, virtual member function access, late binding, pure virtual function, abstract classes.

Module V

Console I/O operations: C++ streams and C++ stream classes – Predefined Objects, unformatted I/O operations, Formatted I/O operations - manipulators - User defined manipulators - Overloading << and >> Operators for Objects.

Disk I/O Operations: Stream Classes, classes for file stream operations, opening and closing a file, file nodes, writing an object to disk, reading an object from disk, binary versus character files, I/O with multiple objects, tellg() and seekg(), seekp() and tellp(). Updating a File : Error Handling During File Operations; Command-Line Arguments ,sequential access to a file, file input/output with stream class,error handling during file manipulations, filter utilities.

Templates: Generic Functions- A generic swap function, Functions with more than one Generic Type, Overloading a Function Template. Generic Classes – A stack generic class, Class template with more than one Generic Type, type name and template keywords, Template Restrictions, The power of Templates.

Exception Handling: Fundamentals of Exception Handling, Catching Class Types, Using Multiple catch statements, Catching All Exception, Restricting Exception, throw statement, Setting the Terminate and Unexpected Handlers, Uncaught exception, bad_exception Classes, and Built-In Exceptions. Exception Vs Error Handling, Assertion in C++.

References

1) Deitel & Deitel, *C++ How to program*, Pearson Education Asia, 7th Edition, 2010.
2) Computer Science: A Structured Programming Approach Using C++, Forouzan, Thomson Learning , 2 Edn
3) C++ Programming: Malik, Thomson Learning , 3 Edn
4) K.R Venugopal Rajkumar, *Mastering C++* , TMH.
5) Gaddis Tony*, Starting Out with C++,* dreamtech Press,

6) Sotter A Nicholas and Kleper J Scott, *Professional C++*, Wiley Publishing Inc.
7) Schildt Herbert, *The Complete Reference C++*, Tata McGraw Hill, 4th Edition

IMCA 206 (DATA STRUCTURES PRACTICALS IN C)

1. Program to represent sparse matrix manipulation using arrays.
2. Program to represent Singly Linked List.
3. Program to represent Doubly Linked List.
4. Program to represent Circular Linked List.
5. Program to represent Linked Stacks.
6. Program to represent Linked Queues.
7. Program to represent string operations.
8. Program to represent Stack operations using array and pointers.
9. Program to represent Queue operations using array and pointers.
10. Program to represent Conversion of infix to postfix.
11. Program to represent Evaluation of Expressions.
12. Program to represent Binary Tree Operations.
13. Program to represent Binary Tree Traversals.
14. Program to represent Searching procedures (Linear search , Binary search and Interpolation search)
15. Program to represent sorting procedures (Selection , Bubble , Insertion ,Quick , Heap , Merge)

IMCA 207 (C++ PRACTICALS)

1. Program to Implement Classes and Objects.
2. Program to Implement Constructors and Destructors with array of Objects.
3. Program to Implement Passing and returning parameters as objects by reference.
4. Program to demonstrate Function Overloading.
5. Program to overload different operators – incr & decr operators with post & pre forms; new, delete, [], () and arithmetic operators.
6. Program to perform pointer sort operation.
7. Program to demonstrate friend functions and friend classes.
8. Program using objects for String manipulation functions.
9. Program to implement different types of inheritances like Multiple, Multilevel and Hybrid.
10. Program to demonstrate the use of Virtual Functions.
11. Program to demonstrate the use of abstract classes.
12. Program to demonstrate I/O streams and functions.
13. Program to Overload << and >> operators as a member and as a non-member operator functions.
14. Program to create a file to store some records and search for a particular record and display it.

15. Program to demonstrate namespaces and Volatile member functions.
16. Program to perform all possible Type Conversions.
17. Program to create function Templates, and overload the function Templates.
18. Program to create a generic stack class and member functions to perform stack operations.
19. Program to implement Exception Handling with minimum 5 exception classes including two built-in exceptions.

Semester III

IMCA 301 - MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Module 1:- Sets: Basic Concepts. **Relations:** Binary relations, Equivalence relations and partition. **Functions:** Different types of functions, Composition and Inverse.

Module 2:- Partial Ordering Relations

Partially ordered set: Representation of Poset - Hasse Diagram, LUB, GLB, well ordered set, meet and join of elements. Mathematical Induction.

Module 3:- Logic

Mathematical logic, Logical operators – Conjunction, Disjunction, Negation, Conditional and biconditional. Truth tables. Equivalence formula, Tautology, methods of proof-direct, indirect, contradiction, equivalence and induction. Inference Theory, Validity by truth table, Rules of Inference.

Module 4:- Graph Theory

Basic terminology: Different types of graphs – Directed and undirected, Simple, Pseudo, Complete, Regular, Bipartite. Incidence and degree, Pendant and Isolated vertex and Null graph. Isomorphism, Sub graphs.

Module 5:- Euler & Hamiltonian Graphs

Walk, Path and Circuit, Connected and disconnected graphs and components, operations on graphs. Euler Graphs, Fleury's Algorithm, Hamiltonian circuits and paths. Traveling salesman problem. Matrix representation of graphs – Incidence and Adjacency matrices.

References

1. Discrete Mathematical Structures with Applications to Computer Science by J. P. Tremblay and R Manohar, Tata McGraw-Hill Publications, 1997.
2. Graph Theory by Narsingh Deo, Prentice-Hall of India publications, 2004. Malik, Thomson Learning , I Edn.
3. Discrete Mathematics for Computer Science, Haggard, Thomson Learning , I Edn.
4. Discrete Mathematics and Its Applications by Kenneth H Rosen. Tata McGraw-Hill Publications.
5. Mathematical foundation of Computer Science by Y. N Sings. New Age international Publishers.
6. Bernard Kolman, Robert.C.Busby & sharon Ross, "Discrete Mathematical structures" Prentice Hall of India,2001.

7. Graham Everest, Thomas Ward: An Introduction to Number Theory, , Springer
Fernando Rodriguez Villegas: Experimental Number Theory, Oxford University Press

IMCA 302 OPERATING SYSTEMS

Module I:

Evolution of operating systems:-Serial processing, Batch Processing, multiprogramming. Types of operating systems-Batch Operating System, Multi programming-Time sharing, Real time, distributed operating systems.

Operating Systems Structures:- Systems Components, Operating System Services, System Calls, System Programs, System Structures, Virtual Machines

Processor Management:-Job and process concept, Operating system view of processes, process-state transition diagram, PCB (Process control block), Threads, Operating system services. Process Scheduling:-Types of schedulers, scheduling and performance criteria, scheduling algorithms, multiple processor scheduling.

Module II:

Inter process synchronization and communication-Concurrent Processes- need for inter process synchronization, critical section problem, mutual exclusion-mutual exclusion algorithms, semaphores-definition busy wait implementation, monitors, inter process communication using messages.

Deadlocks: -Definition –Deadlock characterization-Resource allocation graph, methods for handling deadlocks, deadlock prevention, deadlock avoidance-safe state-resource allocation graph algorithm-Banker's algorithm, deadlock detection, recovery from deadlock.

Module III:

Memory Management:-Preliminaries-address binding, dynamic linking and loading, Overlays. Logical versus physical address space, Swapping, Contiguous allocation Paging-principles of page allocation. Structure of page table- hardware support, multi level paging, hierarchical paging, inverted page table, shared pages.Segmentation-principles of operation, hardware, implementation of segment table, protection and sharing, fragmentation, segmentation with paging.

Module IV:

Virtual Memory-Demand paging –performance. Page replacement-page replacement algorithms. Thrashing, Segmentation and paging implementation of virtual memory, hierarchical address translation tables and MMUS.**Device Management**:-Disk structure, Disk scheduling-FCFS-SSTF-C-Scan-Look, Disk management, Swap space management, Disk reliability.

Module V:

File Management:-File structure, File types, File access, File attributes, and File operations. Directories-Flat directory systems, hierarchical directory systems. File system implementation-Allocation methods-contiguous allocation, linked allocation, indexed allocation

References

1) Abraham Silberschatz and Peter Baer Galvin,Greg Gange „Operating System Concepts", (Sixth Edition) Wiley - India.
2) Milan Milenkovic „Operating systems" TATA Mc GrawHill.
3) Andrew S. Tanenbaum, "Modern Operating System, Prentice Hall

IMCA 303 DATABASE MANAGEMENT SYSTEMS

MODULE I

Introduction to Database Systems and E-R Model

Overview, A Historical Perspective, Files System versus DBMS, Advantages of DBMS, Describing and storing data in a DBMS Transaction management, Structure of a DBMS, People who work with Databases, Overview of Database Design. Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional Features of E- R Model: Key Constraints. Conceptual Design with the E-R Model Overview of Unified Modeling Languages Recommended to use a couple of specific ER-Models (Chen Model, Yourdon Model etc)

MODULE II

Relational Model and Query Languages

Introduction to the Relational Model. Integrity Constraints over Relations :Primary Key, Foreign Key and General Constraints. E-R Model to Relational Model: Entity Sets to Tables, Relationship Sets to Tables, Translating, Relationship Sets with Key Constraints. Translating Relationship Sets with Participation Constraints, Translating Weak Entity Sets, Translating Class Hierarchies. Translating E-R Diagrams with Aggregation, Introduction to Query Languages, Relational Algebra: Selection and Projection Operations. Set Operations, Renaming, Joins, Division

MODULE III

Structured Query Language

Overview of SQL, Basic Queries in SQL, Union, Intersect and Except, Nested Queries, Aggregate Operators, Null Values, Number, String and Date Functions, Using user defined functions inside queries, Complex Integrity Constraints in SQL, Triggers and Views in SQL, Embedded SQL and Cursors

MODULE IV

Relational Database Design

Introduction to Schema Refinement, Functional Dependencies, Properties of Decomposition, Normal Forms: First Normal Form, Second Normal Form,Third Normal Form, Boyce Codd Normal Form, Fourth Normal Form,Fifth Normal Form

MODULE V

Transaction Management, Concurrency Control, Distributed System

and Database Administration.The ACID Properties,Transactions and Schedules, Concurrent Execution ofTransactions: Serialisability, Anomalies Due to Interleaved Execution .Schedules Involving Aborted Transactions, Lock-Based Concurrency Control: 2 PL– Basic &Strict,Dead Locks, Introduction to Crash Recovery,ConcurrencyControl:2 PL, Serialisability, and Recover-ability,:Introduction to Locking Management: Dealing with Deadlock.Introduction to ARIES, Introduction to Distributed Databases: Advantages & Disadvantages, Transaction Types – Local & Global Transactions, Distributed DBMS Architectures, Design of Distributed Databases: Replication, Fragmentation How to add users, space management of table spaces and objects

References

1. Database Management Systems – Raghu Ramakrishnan and Johannes Gehrke, Third Edition, McGraw Hill, 2003
2. Database Systems: Design , Implementaion and Management, Peter Rob, Thomson Learning, 7Edn.
3. Concept of Database Management, Pratt, Thomson Learning, 5Edn.
4. Database System Concepts – Silberchatz, Korth and Sudarsan, Fifth Edition, McGraw Hill, 2006
5. The Complete Reference SQL – James R Groff and Paul N Weinberg,
6. Second Edition, Tata McGraw Hill, 2003

IMCA 304 - MULTIMEDIA SYSTEMS

Module I

Media and data streams - Medium, Properties of a multimedia system, Traditional data streams, Continuous data stream, Information Units. Sound concepts, Music - MIDI, MIDI Devices, MIDI and SMPTE timing standards, MIDI software. Speech - Generation, Analysis, Transmission.

Module II

Images and Graphics - Concepts, Image processing. Video and Animation – Concepts, television , Computer based animation. Data compression - Coding, JPEG-Image preparation, Lossy DCT based Mode, Hierarchical mode, H.261- Image Preparation, Coding Algorithms, Data Stream, MPEG-Video/Audio Encoding, Data stream, MPEG- 2,MPEG-4, DVI.

Module III

Multimedia OS - Real-time, Resource Management, Process Management, File Systems, OS Issues, System Architecture. Multimedia Communication Systems – application Subsystem, Transport Subsystem, QoS and Resource Management.

Module IV

Multimedia DBMS- Characteristics, Data Structure, Operations, Database Model.

Hypertext and Hypermedia, SGML, ODA, MHEG.

Module V
Synchronization- Notion of synchronization, Presentation requirements, Reference model for synchronization, Synchronization Specifications, Synchronization Case Studies- MHEG, HyTime, MODE, ACME.

References:

1) Multimedia: Computing, Communications and Applications, Steinmetz & Nahrstedt, Pearson Education
2) Multimedia communications, Fred Halsall, Pearson Education
3) Multimedia Systems, Koegel Buford, Pearson Education
4) Principles of MultiMedia, Renjan Parekh, Tata Mcgraw Hill Publicaton
5) Fundamentals of MultiMedia, Li Ze-Nian, Drew Mark S., Prentice Hall
6) Rosch ,"Multimedia Bible" Sams Publishing
7) Fred T.Hofstetter, "Multimedia Literacy",Third Edition, Tata McGraw-Hill, 2005
8) Multimedia:Computing,Communications and Applications, Ralf Steinmetz and Klara Nahrstedt,Pearson Education,2006.

IMCA 305: VISUAL PROGRAMMING (C#.NET)

MODULE I
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.

MODULE 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.

MODULE III

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

MODULE 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#.

MODULE V

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

References

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

IMCA 306 MICROPROCESSORS

Module 1 - The Processors : 8086

Register Organization of 8086, Architecture, Signal Description of 8086, Physical Memory Organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum Mode 8086 System and Timings, Maximum Mode 8086 System and Timings. Addressing Modes of 8086.

Module 2 - Instruction Set, Assembler Directives and Assembly Language Programming of 8086

Machine Language Instruction Formats – Instruction Set of 8086-Data transfer instructions,Arithmetic and Logic instructions,Branch instructions,Loop instructions,Processor Control instructions,Flag Manipulation instructions,Shift and Rotate instructions,String instructions, Assembler Directives and operators,Example Programs**,**Introduction to Stack, STACK Structure of 8086, Interrupts and Interrupt Service Routines, Interrupt Cycle of 8086, Non-Maskable and Maskable Interrupts, Interrupt Programming, MACROS.

Module 3 - Special Purpose Programmable Devices and their Interfacing

Data transfer schemes-programmed I/O, Interrupt I/O, DMA, DMA Controller 8257, Programmable Interval Timer 8253, Programmable Interrupt Controller 8259A, Programmable Communication Interface 8251 USART, Programmable Pripheral Interface 8255.

Module 4 – Architecture and Comparison of various Processors

80186,80286,80386,80486, Pentium Case Study on Advanced Multiprocessors

Module 5 - Microcontrollers

Architecture of 8051 Microcontroller – Signals – I/O Ports – Memory – Counters and timers – Serial data I/O – Interrupts – Interfacing – Keyboard – LCD – ADC and DAC, Instruction Set – Programming.

References

1) Advanced Microprocessors and Peripherals – Architecture, Programming and Interfacing by A.K. Ray and K.M. Bhurchand, Tata McGraw Hill,2002 Edition
2) The Intel Microprocessors 8086/8088, 80816/80188, 80286, 80486 Pentium and Pentium Pro Processor – Architecture, Programming and interfacing by Barry B Brey, 4th Edition, PHI.
3) Microprocessors and Interfacing – Programming and Hardware by Douglas V Hall,

2nd Edition, Tata McGraw Hill, 2002.

4) Microprocessor x86 Programming by K.R. Venugopal and Raj Kumar – BPB publications
5) Microprocessors and Microcomputer based system design by Mohamed Rafiqussaman.
6) Micro Controllers – [Theory And Applications] by Ajay V. Deshmukh- Tata McGraw Hill.

IMCA 307 VISUAL PROGRAMMING PRACTICALS (C#.NET PRACTICALS)

.NET Lab Programs

1.Write a Program in C# to Check whether a number is Palindrome or not.
2.Write a Program in C# to demonstrate Command line arguments Processing.
3. Write a Program in C# to find the roots of Quadratic Equation.
4. Write a Program in C# to demonstrate boxing and unBoxing.
5. Write a Program in C# to implement Stack operations.
6. Write a program to demonstrate Operator overloading.
7. Write a Program in C# to find the second largest element in a single dimensional array.
8. Write a Program in C# to multiply to matrices using Rectangular arrays.
9. Find the sum of all the elements present in a jagged array of 3 inner arrays.
10. Write a program to reverse a given string using C#.
11. Using Try, Catch and Finally blocks write a program in C# to demonstrate error handling.
12. Design a simple calculator using Switch Statement in C#.
13. Demonstrate Use of Virtual and override key words in C# with a simple program
14. Implement linked lists in C# using the existing collections name space.
15. Write a program to demonstrate abstract class and abstract methods in C#.
16. Write a program in C# to build a class which implements an interface which is already existing.
17. Write a program to illustrate the use of different properties in C#.
18. Demonstrate arrays of interface types with a C# program.

Semester IV

IMCA 401 Artificial Intelligence

MODULE I

Introduction to Artificial Intelligence - Overview of AI - AI Problems, Assumptions, Techniques, Level of Model, and Criteria for success. Problems, Problem spaces and Search - Problem Definition, Production systems, Problem characteristics, Production system characteristics.

AI languages – Introduction to LISP & PROLOG

MODULE II

Knowledge Representation Schemes -Formalized Symbolic Logics - Syntax and Semantics of Propositional and Predicate logic, Properties of WFFS, Conversion to clausal form, Inference rules, Resolution, Non- Deductive Inference Method. Inconsistencies and Uncertainties – Non-monotonic reasoning, Truth Maintenance system, Default reasoning and the closed world assumption. Structured Knowledge - Associative Networks, Frame Structures, Conceptual Dependencies and scripts. Overview of Object Oriented Systems - Objects, Classes, Messages and Methods.

MODULE III

Knowledge Organization and Management - Search and Control Strategies - Examples of search problem, Uniformed or Blind search, Informed search, Searching AND-OR graphs. Matching Techniques -Structures used for matching, Measures for Matching, Matching like patterns, Fuzzy matching algorithm, RETE Algorithm. Knowledge Organization and Management – Indexing and retrieval techniques, Integrating knowledge in memory, Memory organization systems.

MODULE IV

Knowledge Acquisition - General Concepts in Knowledge Acquisition - Types of learning, Difficulty in Knowledge Acquisition, General learning model, Performance measures. Early work in Machine Learning – Perceptrons, Checkers playing example, Learning automata, Genetic algorithms, Intelligent editors. Analogical and Explanation Based Learning – Analogical Reasoning and learning, Examples, Explanation based learning.

MODULE V

AI Application - Natural Language Processing - Overview of Linguistics, Grammars and Languages, Basic Parsing Techniques, Semantic Analysis and Representation structures, Natural Language generation, Natural language systems. Patterns Recognition - Recognition and Classification process, Classification pattern, Recognizing and Understanding speech. Experts system Architectures – Rule-based system, Non production system, Dealing with uncertainty, Knowledge acquisition and validation, Knowledge system Building Tools.

References

1. Introduction to Artificial intelligence and expert systems by Dan W. Patterson, Prentice Hall India (All Modules).
2. Artificial Intelligence, Elaine Rich, McGraw Hill (Module 1).
3. Principles of Artificial Intelligence, Nilson. N.J, Springer Verlag
4. Introduction to Artificial Intelligence, Charvanak E. and McDermoti D, Addison Wesley
5. Artificial Intelligence and Intelligent Systems by N.P Pandhy. Oxford Publications.

IMCA 402 CRYPTOGRAPHY AND NETWORK SECURITY

Module I

Foundations of Cryptography and Security – Ciphers and Secret Messages, Security Attacks and Services, Mathematical Tools for Cryptography, Substitutions and Permutations, Modular Arithmetic, Euclid's Algorithm, Finite Fields, Polynomial Arithmetic, Discrete Logarithms, Conventional Symmetric Encryption Algorithms, Theory of Block Cipher Design, Feistel Cipher Network Structures, DES and Triple DES, Strength of DES.

Module II

Modern Symmetric Encryption Algorithms, IDEA, CAST, Blowfish, Twofish, RC2, RC5, Rijndael (AES), Key Distribution, Stream Ciphers and Pseudo Random Numbers, Pseudo Random Sequences, Linear Congruential Generators, Cryptographic Generators, Design of Stream Cipher, One Time Pad.

Module III

Public Key Cryptography – Prime Numbers and Testing for Primality, Factoring Large Numbers, RSA, Diffie-Hellman, ElGamal, Key Excahnge Algorithms, Public-Key Cryptography Standards

Module IV

Hashes and Message Digests – Message Authentication, MD5, SHA, RIPEMD, HMAC, Digital Signatures, Certificates, User Authentication, Digital Signature Standard, Security Handshake Pitfalls, Elliptic Curve Cryptosystems.

Module V

Authentication of Systems, Kerberos, Electronic Mail Security, Pretty Good

Privacy, IP and Web Security, Secure Sockets and Transport Layer, Electronic

Commerce Security, Electronic Payment Systems, Secure Electronic Transaction,

Digital Watermarking.

REFERENCE

1) William Stalings, Cryptography and Network Security, Principles and Practices. 3rd Ed., Pearson Education, 2005.
2) Behrouz A Forouzan, Cryptography and Network Security, Tata Mc Graw Hill, 2005
3) Atul Kahate, Cryptography & Network Security, Tata Mc Graw Hill,2003
4) Kaufman,Speciner, Network Security, PHI Learning Private Limited, 2013

IMCA 403(A) – E-COMMERCE

(Elective-I)

Module1
INTRODUCTION -Traditional commerce and E commerce – Internet and WWW – role of WWW – value chains – strategic business and Industry value chains – role of E commerce.

Module II
INFRASTRUCTURE FOR E COMMERCE
Packet switched networks – TCP/IP protocol script – Internet utility programmes – SGML, HTML and XML – web client and servers – Web client/server architecture – intranet and extranets.

Module III
WEB BASED TOOLS FOR E COMMERCE
Web server – performance evaluation - web server software feature sets – web server software and tools – web protocol – search engines – intelligent agents –EC software – web hosting – cost analysis

Module IV
SECURITY
Computer security classification – copy right and Intellectual property – electronic

commerce threats – protecting client computers – electronic payment systems – electronic cash – strategies for marketing – sales and promotion – cryptography – authentication.

Module V

INTELLIGENT AGENTS

Definition and capabilities – limitation of agents – security – web based marketing search engines and Directory registration – online advertisements – Portables and info mechanics – website design issues.

References

1. Ravi Kalakota, " Electronic Commerce", Pearson Education

2. Gary P Schneider "Electronic commerce", Thomson learning & James T Peny Cambridge USA, 2001.

3. Manlyn Greenstein and Miklos "Electronic commerce" McGraw-Hill, 2002.

4. Efraim Turvan J.Lee, David kug and chung, "Electronic commerce" Pearson Education Asia 2001.

5. Brenda Kienew E commerce Business Prentice Hall, 2001.

IMCA 403(B) – CLIENT SERVER COMPUTING

Elective -I

Module 1

Overview of C/S Computing: Definition, Benefits & Evolution, Hardware & Software, Trends, Evolution of operating systems, networking trends. Overview of C/S applications: components, classes, categories. Overview of C/S computing: Dispelling the Myths, Obstacles- Upfront and hidden, open systems and standards, Standards setting organizations, factors of success.

Module II

Client hardware and software: Client components and operating systems. What is GUI?,Xwindow vs. windowing, database access. Application logic client software products: GUI environments, converting 3270/5250 screens, database access tools.
Client requirements: GUI design standards, Open GUI standards, Interface dependents, testing interfaces, development aides.

Module III

Server hardware: Benchmarks, categories of servers, features and classes of server

machines. Server Environment: eight layers of software, network management and computing environments, extensions, network operating systems, loadable modules. Server operating systems: OS/2, Windows new technology, UNIX based operating systems.

Module IV

Server Requirements: Platform independence, transaction processing, connectivity, intelligent database, stored procedures, Triggers, Load Leveling, Optimizer, testing and diagnostics tools, real ability backup and recovery mechanisms.

Module V

Server data management and access tools: Data manager features, data management software, database gateways. LAN hardware and software, Network Operating Systems.

References

1. Dawna Travis Dewire , Client Server Computing, McGraw Hill International
2. Tanenbaum and Van Steen, Distributed Systems Principles and Paradigams,
3. Pearson Education, 2005
4. Orfali,Harkey and Edwards, The Essential Client server Survival guide, 2Nd edition Galgotia, 2003
5. Jeffrey.D.Schan, C/S Application and Architecture, Novell Press, BPB
6. Joe Salami, Guide to C/S Databases, Bpb Publn., 1994
7. David Vaskevitch , Client Server Strategies, Galgotia, 1994.

IMCA 403(C) BIOINFORMATICS

(Elective I)

Module I

Biology for Bioinformatics :- Basic concepts - cells- Archaebacteria, Biomembranes, Nucleus, Organelles, Mitochondria, Chloroplasts, Viruses, BacterioPhage, Genetic contents of a cell - Viral Proteins - Amino acid, DNA and RNA - Forms of DNA.

Module II

Genetic Code :- Genome - Gene Expressions - Protein Synthesis - Transcription RNA - Processing- Capping- Splicing - Editing, Cell Signaling, DNA cloning Genomic library - cDNA library - Probes - Screening.

Module III

Databases :- Characteristics of Bioinformatics, Database - Categorizing, Navigating, Information Retrieval systems, Sequence Databases, Structure Databases.

Module IV

Other Databases :- Enzyme Databases, MEROPS, BRENDA, Pathway Databases: CAZy, Disease Databases, Literature Databases, Other specified Databases.

Module V

Python for Bioinformatics.

References

1. BIOINFORMATICS Databases, Tools and Algorithms, Orpita Bosu, Simminder Kaur Thukral., Oxford University Press.
2. Learning Python., Mark Lutz & david Ascher., O'Reilly.
3. Introduction to Bioinformatics, T. K. Attwood, D J Parry-Smith., Pearson Education. Essential Bioinformatics., Jin Xiong., Cambridge University Press.
4. Fundamental Concepts of Bioinformatics. Dan E. Krane, Michael L. Raymer., Pearson Education.

IMCA 404 DATA COMMUNICATIONS

Module I

Signals:-Simplified data communications model**.** Electric signals - continuous and discrete signals, periodic signals, Fourier Series Representation of Periodic Signals, Frequency, Spectrum and Bandwidth. Analog and Digital data transmission - data and signals, analog and digital transmission, their comparison, Digital data rate and band width. Transmission impairments - Attenuation, Delay distortion, Noise, Channel Capacity.

Transmission Media :- Guided Transmission Media -Twisted pair wires, Coaxial, Optical fiber. Wireless Transmission - Terrestrial microwave, satellite microwave, broad cast Radio, Infrared.

Module II

Digital Transmission:-Digital Data, Digital Signal:-Line coding-characteristics of line coding, Line coding schemes- Unipolar encoding:- NRZ, RZ, Manchester, Differential Manchester. Bipolar encoding:- AMI., Block coding Analog Data, Digital Signal:- Sampling, Sampling theorem, Nyquist rate, Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM).

Module III

Analog Transmission:-Modulation of Analog signals:- Analog to Analog modulation-Amplitude Modulation, Frequency Modulation, and Phase Modulation.

Modulation of Digital Data – Bit Rate and Baud Rate, ASK, FSK, PSK,QAM. Modems. **Multiplexing**:- FDM, TDM, statistical TDM, WDM. Channnelization:- FDMA, TDMA,CDMA.

Module IV

Transmission mode:- Parallel transmission, Serial transmission, Asynchronous

transmission, synchronous transmission. Line Configurations, full duplex and half duplex transmission.

Circuit switching:- Telephone networks-local loops, trunks.

Packet switching :- Datagram, virtual circuit. Effect of packet size on transmission time. Comparison of circuit switching and packet switching

Module V

High-Speed Digital Access:- DSL Technology-ADSL, xDSL, Spread Spectrum- Concept, Frequency Hopping, Direct Sequence

Cellular Telephony:- Basic concepts, Frequency–Reuse Principle, Transmitting, Receiving, Handoff, Roaming. First Generation, Second Generation-GSM, Third Generation.

References

1. William Stallings -Data and Computer communications – Prentice Hall of IndiaVIIth Edition.
2. Behrouz A Forougan, Data Communications and Networking, 4th ed.McGraw Hill
3. Andrews S. Tanenbaum -Computer Networks, Prentice Hall of India, 4th Edition.
4. Michael Duck,Richard Read,Data Communication And Computer Networks for Computer Scientist Engineers

IMCA 405 MANAGEMENT INFORMATION SYSTEMS

Module I

DigitalFirm-Concepts,Definition,Role,Control System, Management Support , Management Effectiveness, Digital Firm. E-Business and E-Commerce, System Concepts, Feedback and Control, Corporate Planning, Types of strategies, Business Planning, Balance Score Card, Strategic Business Planning. Security Challenges- threats and vulnerabilities, controlling threats, disaster management, information security.

Module II

DSS, Decision Analysis, Organizational Decision Making, concepts on information, Information Classification, Knowledge and Knowledge management. Business Intelligence, Expert Systems. System Analysis, General Model of MIS, Need and role of System Analysis, System development Model, OOA, SSAD, OOSAD Development Life Cycle. Development process of MIS, Process Model.

Module III

Business Process Re-engineering, Value Stream Model, MIS and BPR. DSS, GDSS, Knowledge

Management Systems, DSS in E-enterprises, Enterprise Management System, ERP, SCM, CRM, EMS and MIS.

Module IV

Technology of IS - Data Processing, Transaction Processing, OLAP, TQM, Networks - Topology, Data Communication, Unified Communications, Components of UC, WiMAX. Database- Database Models, Database Design, RDBMS, Client-Server Architecture and implementation strategies. Data Warehouse, Architecture of Data Warehouse, Implementation.

Module V

E-Business, Internet and WWW, E-Commerce, categories of E-Commerce, Electronic payment Systems, Content Management Systems, Enterprise Portal, Security in e - business, privacy issues, Tools for security management, Systems Control and Audit, Global MIS - Outsourcing and Off shoring, Global Business strategies.

References

1) Management Information System, Laudon, Laudon & Dass, 11th Edition, Pearson Education
2) Management Information Systems, Waman S Jawadekar, 4th Edition, McGraw Hill
3) Management Information Systems, O'Brien, Marakas and Behl, 9th Edition, Tata Mcgraw Hill Publication.
4) Management Information System, Davis & Olson, Tata McgrawHill Publication.
5) Information system for Modern management, Murdick, Rose & Cloggett, PHI Publications.

IMCA 406 (DBMS PRACTICALS)

1. Installation and configuration of Oracle Database
2. Table Design- Using foreign key and Normalization
3. Practice SQL Data Definition Language(DDL) commands
   a. Table creation and alteration(include integrity constraints

      such as primary key, referential integrity constraints, check, unique and null constraints both column and table level

   b. Other database objects such as view, index, cluster, sequence, synonym etc.
4. Practice SQL Data Manipulation Language (DML) commands
   a) Row insertion, deletion and updating
   b) Retrieval of data
      i. Simple select query
      ii. Select with where options (include all relational and logical operators)
      iii. Functions: Numeric, Data, Character, Conversion and
      iv. Group functions with having clause.

5. Set operators
    a. Sorting data
6. Sub query (returning single row, multiple rows, more than one column, correlated sub query)
7. Joining tables(single join, self join, outer join)
8. Data manipulations using date functions xi) User defined functions in a query
9. How to use hints in queries to optimize performance
10. Manage ODBC/JDBC connections
11. Practice Transaction Control Language (TCL) commands (Grant, revoke, commit and save point options)
12. Usage of triggers, functions and procedures using PL/SQL constructs
13. Development of sample applications using Oracle as Back End Sample applications may include
    i) Payroll Information System
    ii) Student Information System
    iii) Bank Transaction
    iv) Library Information System etc.
14. How to take back up and restore using Oracle
15. How to conduct query optimization in a database

IMCA 407 (MICROPROCESSORS PRACTICALS)

I) Programs to get familiarized with Microprocessor Kit.

a) Program to implement various addressing modes like Immediate,
    a. Direct, Indexed, etc.

b) Program to find one's complement of a 16 bit number.

c) Program to mask off bits selectively.

d) Program to perform addition of 2 16 bit numbers.

e) Program to perform division by 8 and multiplication by 16 using shift and rotate instructions.

ii) Program to display a message on screen using Code and Data Segment.

iii) Programs to perform arithmetic, logic, shift and string instructions.

iv) Programs to implement modular programming using Stacks, subroutines, macros, etc.

v) Programs for display/video manipulation.

vi) Programs to get familiarized with DOS and BIOS interrupts..

Note:- A minimum of 20 programming examples have to be done.

References :

1. Microprocessor x86 Programming – K.R. Venugopal and Raj Kumar – BPB publications
2. The Intel Microprocessors 8086/8088, 80186/188, 80286, 80386, 80486,Pentium & Pentium Pro Processor Architecture, Programming and Interfacing- Barry B. Brey – PHI Edition
3. Microcomputer Systems – The 8086/8088 Family Architecture, Programming & Design – Yu Cheng Liu , Glenn A Gibson – PHI Edition.

Semester V

IMCA 501 OPERATIONS RESEARCH

Module I

Linear programming problems - Mathematical formulation, graphical method of solution, simplex method

Module II

Duality in linear programming problems, dual simplex method, sensitivity analysis, transportation and assignment problems, Traveling salesman Problem.

Module III

Game theory Introduction, two-person zero-sum games, some basic terms, the maxmini-minimax principle, games without saddle points-Mixed Strategies, graphic solution of 2 *n and m*2 games, dominance property. CPM & PERT- project scheduling, critical path calculations, Crashing.

Module IV

Queueing theory -basic structure of queuing systems, roles of the Poisson and exponential distributions, classification of queues basic results of M/M/1: FIFO systems, extension to multi-server queues.

Module V

Simulation: simulation concepts, simulation of a queuing system using event list,pseudo random numbers, multiplication congruential algorithm, inverse transformation method, basic ideas of Monte-Carlo simulation.

References

1) Taha.H.A ,operation Research : An Introduction, McMilan publishingcCo., 1982.7th ed.
2) Ravindran A, Philips D.T & Solbery.J.J, Operations Research:Principles and practice, John Wiley & Sons, New York, 1987.
3) Frank S. Budnick, Dennis Mcleavey and Richard Mojena,
   Principles of Operations Research for Management. All India Traveler Book seller, Delhi.
4) G.Srinivasan, Operations Research, Principles And Applications, Prentice Hall,2008
5) Kanthi Swaroop,Manmohan Gupta P K ,Operations Research,Schandh,2008

IMCA 502 COMPILER DESIGN

Module I:

Introduction to compilers: Compilers and Translators, need for translators, phases of compiler, pass structure of compiler, book keeping, compiler writing tools, bootstrapping of compiler.

Module II:

Finite Automata and Lexical Analysis: Role of lexical analyzer, design of lexical analyzer, Transition Diagrams, specification of tokens, recognition of tokens, regular expressions, finite automata, from regular expressions to finite automata, finite state machines, NFA to DFA, minimizing DFA, language for specifying lexical analyzers (Analyzer Generator: LEX)

Syntactic specifications: grammars, context free grammars, parse trees, ambiguous grammar, regular expressions and context free grammars, non context free grammars.

Module III:

Basic Parsing Techniques: Parsers, parse tree representation, shift -reduce parsing, handles, stack implementation of shift-reduce parser, operator precedence parsing, top-down parsing, left recursion, left-factoring, Bottom up parsing, predictive parsers.

Module IV:

Automatic construction of Efficient parsers: LR parsers, canonical collection of LR(0) items, SLR parsing tables, canonical LR parsing table, LALR parsers.

Symbol table management, Error handling: - sources and reporting.

Module V:

Intermediate code generation:-postfix notation, syntax tree, three-address code, basic blocks and flow graph, DAG representation of basic blocks. Code optimization: - The principal sources of optimization, optimization of basic blocks, loops in flow graphs, Peephole optimization. Code Generations: - Issues in the design of a code generator, simple code generator.

References*:*

1. Alfred V Aho , Jeffrey D. Ullman, “Principles of Compiler Design”, Narosa

2. Aho, Ullman and Sethi, “Principles of Compiler Design”, Addison Wesley

3. J. P. Trembley and P. G. Sorensen, “Theory and Practice of Compiler Writing”, McGraw Hill.

4. Holub, “Compiler Design in C”, PHI.

5. Sudha Sadhasivam G,Compiler Design,2008

IMCA 503 DISTRIBUTED COMPUTING

Module I

Introduction to distributed systems – definition, goals, types. Architectures- System architectures, architectures versus middle ware, self management. Processes – Threads, Virtualisation, Clients, Servers, Code Migration

Module II

Communication – RPC, Message oriented, Stream oriented. Naming – flat naming, structured naming, attribute based naming. Synchronization – Clock synchronization, Logical Clocks,Election Algorithms, Mutual Exclusion

Module III

Consistency and replication – Data centric consistency, client centric consistency, consistency protocols. Fault Tolerance – introduction, process resilience, reliable client-server communication, reliable group communication, distributed commit. Introduction to Distributed File Systems

Module IV

CLOUD ARCHITECTURE AND MODEL

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

Module V

VIRTUALIZATION

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management - Cloud Security Challenges and Risks

References

1. Distributed Systems – Principles and Paradigm, Tanenbaum& Van Steen, 2nd Edition, PHI Publications
2. Elements of Distributed Computing, Garg, Wiley Publications
3. Distributed Operating System, Pradeep K Sinha, PHI Publications
4. "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things",Kai Hwang, Geoffrey C Fox, Jack G Dongarra, Morgan Kaufmann Publishers, 2012.
5. "Cloud Computing: Implementation, Management, and Security" John W.Rittinghouse and James F.Ransome, , CRC Press, 2010.
6. "Cloud Computing, A Practical Approach" Toby Velte, Anthony Velte, Robert Elsenpeter, TMH, 2009.
7. "Cloud Computing – insights into New-Era Infrastructure", Kumar Saurabh, Wiley India,2011.

IMCA504 COMPUTER NETWORKS

Module I

Networking Concepts: Simplified network model. Classification of networks: LAN, MAN, WAN and the Internet. Protocols and protocol architecture. The OSI ref. Model, TCP/IP ref. model, its origin, the Internet layer, the TCP layer, the application layer. Comparison of the OSI and TCP/IP ref. models. A critiques of the OSI model and protocols, A critique of the TCP/IP ref. model, Novel Netware.

Data Link Layer: Need for data link control, Frame synchronization - flag fields, bit stuffing, flow control - stop and wait , sliding window protocol, error detection - parity check, CRC, Error control - Stop and wait ARQ, Go back-N ARQ, HDLC protocol, other data link protocols - LAPB, LAPD.

Module II

Local Area Networks: LAN protocol architecture (IEEE - 802 reference model), Topologies - Bus, tree, ring and star. Logic link control. Medium access control:-Random access- Aloha, CSMA, CSMA/CD, Exponential Back off algorithm ,CSMA/CA, controlled access-Reservation, Polling, Token Passing.

LAN systems: Traditional Ethernet:-MAC sub layer access method(CSMA/CD) ,IEEE 802.3 MAC frame, Addressing physical layer, Physical Layer, Physical Layer, Implementation, Bridged Ethernet, Switched Ethernet, Full-Duplex Ethernet.

FAST ETHERNET:- Mac Sublayer, Physical Layer, Physical Layer Implementation, GIGABIT ETHERNET:- MAC Sublayer, Physical Layer, Physical Layer Implementation. **LAN Connecting Devices**-Repeaters, Hubs, Bridges:- filtering, Transparent Bridges, Spaning Tree Algorithm.Two-Layer Switch. **Backbone Networks**-Bus
Backbone, Star Backbone, Connecting Remote LANs.

Module III

Wireless LAN Technology:-Overview-Wireless LAN Applications, Wireless LAN Requirements, Wireless LAN Technology. Infrared LANs-Strengths and Weakness, Transmission Techniques. Spread Spectrum LANs- Configuration, Transmission Issues. Narrowband Microwave LANs.

IEEE 802.11 Wireless LAN Standard:- IEEE 802.11 Architecture and Services, Medium Access Control-CSMA/CA, Physical Layer-IEEE-802.11 FHSS, IEEE-802.11, DSSS, IEEE-802.11a OFDM, IEEE-802.11b HR-DSSS, IEEE-802.11g OFDM. IEEE- 802.11 Addressing Mechanism. **Blue Tooth**:- Architecture, Bluetooth Layers, Radio Layer, Baseband Layer, L2CAP, Other Upper Layers.

VIRTUAL LANS:- VLAN Technology, Membership, Configuration, Communication Between Switches, IEEE Standard, Advantages.

Module IV

Network Layer: Services of NW layer, Routing: Characteristics, performance criteria, routing strategies: fixed routing, flooding, random routing, Adaptive routing, congestion control,

Switched WAN - Virtual Circuit Switching, Global addressing, Virtual circuit identifier, Connection Setup:- Permanent Virtual Circuit, Switched Virtual Circuit, X.25 WAN, X.25 layers and protocols.

Module V

High Speed Switched WANs.

Frame Relay:- Back ground, Architecture, Frame Relay Layers, Frame Relay frame -LAPF core, LAPF control.

ATM :- design goals, Cell Network, Asynchronous TDM, ATM Architecture, Identifiers, ATM Layers:- ATM layer, ATM Headers, ATM Adaptation Layer:- AALI, AAL2, AAL3/4, AAL5.

Transport Layer: Services, elements of transport protocol, simple transport protocol.

References

1. Behrouz A. Forouzan - Data Communications and Networking-Fourth Edition- Tata McGraw Hill
2. William Stallings- Data and computer communications- PHI- Seventh Edition.
3. Andrew S Tanenbaum- Computer Networks - Fourth Edition- PHI.
4. William Stallings - Wireless Communications and Networks-Pearson Education.
5. William Stallings- ISDN and BROADBAND ISDN WITH FRAME RELAY AND ATM-Fourth Edition – Pearson Education.
6. Gerd Keiser - Local Area Networks- Second Edition - Tata McGraw Hill

IMCA505 SOFTWARE ENGINEERING

Module 1 The Software Process

Software and Software Engineering, Software Process- Process Frame Work models,Software Development Process Models- The Waterfall Model, V-Model, Incremental Process Models,Time Box Model, Prototyping the Spiral Model, Concurrent Models. Software Implementation And Project Management, Agile Manifesto, Principlesthat Guide Practice.

Module II Modeling and Design

Understanding Requirements, Requirements Modeling: Scenarios, Information, and Analysis Classes, Requirements Modeling for WebApps, Design Concepts, Software Architecture : Definition, Importance and Styles, User Interface Design. Small Case study on Requirements Engineering.

Module III Quality Management

QualityConcepts, Inspection, Review Techniques, Software Quality Assurance, Software Configuration Management, Product Metrics

Module IV Testing

Software Testing Strategies,Test Case Design, Testing Conventional Applications, Testing Object-Oriented Applications, Testing Web Applications

Module V Project Management

Project Management Process - Concepts, Process and Project Metrics, Estimation for Software Projects, Project Scheduling, Risk Management

References

1. Pressman, R.S., Software Engineering: A Practitioner's Approach, MGHISE, 7th Edition, 2010
2. Sommerville, I., Software Engineering, Pearson Education, 7th Ed., 2005.
3. Software Engineering principles & Practice- Waman S Jawadekar 2nd Edition, Tata Mc-Graw Hilll Publishing Co. Ltd.
4. Schach, S., Software Engineering, TMH, 7th Ed., 2007
5. Kelkar, S.A., Software Engineering: A Concise Study, PHI, 2007
6. W.S., Managing the Software Process, Addison Wesley, 1999
7. Hughes, B and Cotterel, M., Software Project Management, 3rd
8. Edition, TMH, 2004.
9. Brooks, F.P., The Mythical Man-Month, Pearson, 1995

IMCA 506 (COMPILER DESIGN PRACTICALS)

Part-A

Programs using C language:

1. Write a C program to recognize strings under 'a', 'a*b+', 'abb'.

2. Write a C program to test whether a given identifier is valid or not

3. Write a program to check whether a string belongs to the grammar or not.

4. Implementation of Lexical Analyzer for 'if' Statement

5. Implementation of Lexical Analyzer for Arithmetic Expression

6. Write a program to generate a parse tree.

7. Write a program to find leading terminals.

8. Write a program to find trailing terminals.

9. Write a program to compute FIRST and FOLLOW of non-terminals.

10. Write a program to check whether a grammar is left recursive and remove left recursion.

11. Write a program to check whether a grammar is Operator precedent.

Part-B

Practicing Compiler Writing Tools:

1. Practice with “LEX” and “YACC” tools of Compiler writing.

References:

1.Allen I Holub ,Compiler design in C,Prentice Hall of India ,2003.
2.Vinu V .Das,Compiler design using FLEX and YACC,Prentice Hall of India ,2008

IMCA 507 (CLOUD COMPUTING PRACTICALS)

1. Installation and configuration of Hadoop/Euceliptus etc.
2. Service deployment & Usage over cloud

3. Management of cloud resources
4. Using existing cloud characteristics & Service models .
5. Cloud Security Management.
6. Performance evaluation of services over cloud .
7. Working of Goggle Drive to make spreadsheet and notes.
8. Installation and Configuration of Justcloud.
9. Working in Cloud9 to demonstrate different language.
10. Working in Codenvy to demonstrate Provisioning and Scaling of a website.
11. Installation and Configuration of Hadoop/Eucalyptus
12. Working and installation of Google App Engine
13. Working with Mangrasoft Aneka Software

SEMESTER VI

IMCA601 RESEARCH METHODOLOGY

Module I :

Meaning of Research – Types of Research.Research process- Problem definition-Objectives of Research- Research design- Data collection –Data Analysis –Interpretation of Results-Validation of Results.Formulation of a Research problem.

Module II:

Basic Statistical measures - Measures of central tendency – Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean, Measures of variation – Range, Mean Deviation, Quartile Deviation, and Standard Deviation.

Module III:

Ethics of Research- Scientific Misconduct- Forms of Scientific Misconduct. Measurement parameters- Measurement of errors - Measurement uncertainty. Statistical test of hypothesis- T-test, Z Test, F-test, Chi-square test.

Module IV:

Guidelines for writing research Papers - Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusion sections of a manuscript. Impact factor-Validity, Merits, limitations.Other measurements of impact.h-index-advantages, criticism of h-index-modification of h-index.

Module V:

Intellectual property rights (IPR)- forms of IPR- patents-copyrights-Trademarks-Industrial design-geographical indication. Protection of plant varieties and farmers rights.Patent Facilating centre - Do's and Don'ts of patents.Introduction to Latex, Basic Latex Commands and Documentation

REFERENCE:

1. Research Methodology By R Panneerselvam - Prentice Hall International 2004 - Eleventh printing, 2013.
2. Research Methodology By CR Kothari - New Age International publishers Second Revised Edition, Reprint 2013.
3. Research Methodology By Francis C. Dane, Brooks/Cole Publishing Company, California.

IMCA 602 IT INFRASTRUCTURE MANAGEMENT

Module 1

INFRASTRUCTURE MANAGEMENT OVERVIEW: Definitions, Infrastructure management activities, Evolutions of Systems since 1960s (Mainframes-to- Midrange-to-PCs-to-Client-server computing-to-New age systems) and their management, growth of internet, current business demands and IT systems issues, complexity of today's computing environment, Total cost of complexity issues, Value of Systems management for business.

Module 2

PREPARING FOR INFRASTRUCTURE MANAGEMENT: Factors to consider in designing IT organizations and IT infrastructure , Determining customer's Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).

Module3

SERVICE DELIVERY PROCESSES: Service-level management, financial management and costing, IT services continuity management, Capacity management, Availability management.

Module 4

SERVICE SUPPORT PROCESSES: Configuration Management , Service desk, Incident management, Problem management, Change management, Release management.

Module 5

STORAGE AND SECURITY MANAGEMENT: Introduction Security, Identity management, Single sign-on, Access Management, Basics of network security, LDAP fundamentals, Intrusion detection, firewall, security information management. Introduction to Storage, Backup & Restore, Archive & Retrieve, Space Management, SAN & NAS, Disaster Recovery, Hierarchical space management, Database & Application protection, Baremachine recovery, Data retention.

References

1. Sjaak Laan, IT Infrastructure Architecture- infrastructure building blocks and concept, Lulu Com 2013
2. Manish Mahajan, Shikha Gupta, IT infrastructure and management
3. Phalguni Gupta, Surya Prakash, Umarani Jayaraman, IT infrastructure and its management
4. Manoj Kumar Choubey, Saurabh Singhal, IT Infrastructure and Management

IMCA 603(A) – (Elective-II)

ANDROID PROGRAMMING

Module I

INTRODUCTION - Setting up development environment, Dalvik Virtual Machine & .apk file extension, Fundamentals: Basic Building blocks, Activities, Services, Broadcast Receivers & Content providers, UI Components – Views & notifications, Components for communication - Intents & Intent Filters. Android API levels (versions & version names).

Module II

Application Structure–AndroidManifest.xml, Uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Drawable Resources, Activities and Activity lifecycle, First sample Application.

Module III

Emulator-Android Virtual Device–Launching emulator, Editing emulator settings, Emulator shortcuts, Logcat usage, Introduction to DDMS, Second App(switching between activities)– Develop an app for demonstrating the communication between Intents.
Basic UI design – Form widgets, Text Fields, Layouts.
Preferences – Shared Preferences, Preferences from xml.

Module IV

Menu – Option menu, Context menu, Sub menu, Menu from xml, Menu via code.
UI design – Time and Date, Images and media, Composite, AlertDialogs & Toast, Popup.
Styles & Themes– styles.xml, drawable resources for shapes, gradients (selectors), style attribute in layout file, Applying themes via code and manifest file.
Content Providers – SQLite Programming, SQLiteOpenHelper , SQLiteDatabse , Cursor , Reading and updating Contacts , Reading bookmarks.

Module V

Adapters and Widgtes – Adapters: ArrayAdapters , BaseAdapters **–** ListView and ListActivity, Custom listview, GridView using adapters, Gallery using adapters.
Custom components – Custom Tabs, Custom animated popup panels, Other components.
Threads - Threads running on UI thread (runOnUiThread), Worker thread , Handlers & Runnable.

References

1) Android Apps for Absolute Beginners , Wallace Jackson, 2nd Edition.
2) Android Design Patterns, **Greg Nudelman**

3) Programming Android, Zigurd Mednieks, Laird Dornin, G. Blake Meike & Masumi Nakamura

4) Hello, Android(Introducing Google's Mobile Development Platform), Ed Burnette, Third Edition

IMCA 603(B) – (Elective-II)

DISTRIBUTED PROCESSING

Module I

Introduction: Definition, Characteristics, Goals and applications of Distributed Computing, Basic design issues and user requirements.

Interprocess Communication: Client Server Communication, Group Communication, IPC in UNIX, Remote Procedure Calls, Design issues and implementation.

Module II

Distributed Operating Systems: Introduction, kernel, processes and threads, Naming and protection - Communication and Invocation, virtual memory, Distributed file services - design issues, interfaces, implementation techniques, Case study sun NFS, Name services: Name spaces; Name resolution, Domain Name System, SNS and DNS, Peer-to-Peer Systems.

Module III

Distributed Transactions:Simple distributed transactions and Nested transactions, Atomic Commit protocols, Concurrency control, N distributed transaction, Distributed deadlocks, Transactions with replicated data.

Module IV

Distributed Shared Memory: Introduction, Design and implementation issues, Sequential, consistency and Ivy case study, Release consistency and Munin case study, Other consistency models.

Module V

Recovery and fault tolerances: Transaction recovery, logging - shadow versions, fault model for transaction; Fault tolerance: characteristics; Hierarchical and group masking of faults; Security, authentication and key distribution, logic of authentication, digital signatures; Web Services: SOAP, XML, CORBA, Distributed object based systems, Distributed file systems, Distributed web- based systems, Distributed coordination based systems.

References:

1. George Coulouris, Jean Dollimore, Tim Kindberg, Distributed Systems: Concepts and Design, 4th Edition, Pearson Education, 2005.

2. George Coulouris, Jean Dollimore, Tim Kindberg : Distributed Systems : Concepts and Design 2nd edition, Addison-Wesley Publishing Company.

3. A.tS. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2006.

4. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.

5. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGrawHill Series in Computer Science, 1994.

6. Nancy A. Lynch, "Distributed Algorithms", The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers, 2000.

IMCA 603(C) –(Elective-II)

INTERNET TECHNOLOGY AND APPLICATIONS

Module I

Introduction-protocols and standards,The OSI model,TCP/IP Protocol suite, Addressing,connecting devices,Swtiching,packet,Internet Protocol(IP), IP addressing: Classful addressing, Classless addressing, Private Networks, Virtual Private Network and Network Address Translation(NAT).,subnetting and supernetting. Other Network layer Protocols: ARP, RARP, ICMP, IGMP.

Module II

Autonomous Systems. Unicasting, Unicast Routing Protocols : Interior Gateway Routing Protocol- RIP, OSPF. Exterior Gateway Routing Protocols - BGP. Multicasting, Multicast applications, Multicast Routing Protocols: MOSPF, DVMRP. Host Configuration Protocols: BOOTP, DHCP.

Module III

Introduction to transport layer,Transport layer services,UDP-User datagram,Use of UDP,UDP operation,UDP services,UDP applications,UDP package.TCP-TCP services,TCP Features,Segment,TCP connection,Flow control,Error control,Congestion control,TCP timers,TCP Package.SCTP-SCTP services,SCTP Features, Flow control,Error control,Congestion control

Module IV

DNS-need for DNs,name space,DNs in the internet,Resolution,DNs messages,Types of records,DDNS,Security of DNS.Telnet-concepts,NVT,embedding.SSH-components,SSH packet format.FTP-connection,communication,command processing,file transfer ,anonymous FTP,Security for FTP.TFTP-Messages,connection,data transfer,UDP ports,Security,applications.

WWW- architecture,web documents.HTTP:- Transactions, Request messages, Response message, Headers. Electronic Mail: Architecture, User agent - Sending Mail, Receiving Mail. Multipurpose Internet Mail Extensions (MIME). Mail transfer agent: SMTP. Mail access protocols: POP and IMAP.

Module V

Multimedia-introduction,digitizing audio and video,audio and video compression,streaming stored audio and video,streaming live audio/video.Real time interactive audio/video,RTP,RTCP,voice over IP.

References

1. Behrouz A. Forouzan - TCP/IP Protocol Suite- Fourth Edition- Tata McGraw Hill
2. Andrew S Tanenbaum- Computer Networks- PHI- Fourth Edition.
3. Behrouz A. Forouzan - Data Communications and Networking- Fourth Edition- Tata McGraw Hill
4. William Stallings- Data and computer communications- PHI- Seventh Edition.
5. Douglas E. Comer- Internetworking with TCP/IP- Volume I- PHI- Third Edition.
6. Comer, Douglas. The Internet Book: Everything you need to know about computer networking and how the Internet works, 4th Ed., 2007

IMCA 603(D) – (Elective-II)

EMBEDDED SYSTEM DESIGN

Module I

Introduction - Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Embedded computing – characteristics of embedded computing applications

– embedded system design challenges – constraint-driven design – IP-based design – hardware and software co-design.

Module II

Development Environment - The Execution Environment - Memory Organization - System Space - Code Space - Data Space - Unpopulated Memory Space - I/O Space - System Start-up - Interrupt Response Cycle - Function Calls and Stack Frames - Run-Time Environment - Object Placement.

Module III

Embedded Computing Platform - CPU bus – memory devices – I/O devices – component interfacing – designing with microprocessors – development and debugging – design example – design patterns – dataflow graphs – assembly and linking – basic compilation techniques – analysis and optimization.

Module IV

Distributed Embedded System Design - Inter-process communication: signals – signals in UML – shared memory communication – accelerated design – design for video accelerator – networks for embedded systems – network based design – Internet enabled systems.

Module V

Design Technique - Design methodologies and tools – design flows – designing hardware and software components - requirement analysis and specification – system analysis and architecture design – system integration – structural and behavioural description - case studies.

References

1) Wayne Wolf, “Computers as Components: Principles of Embedded Computer Systems Design”, Morgan Kaufman Publishers.

2) Jean J.Labrosse, “Embedded system Building blocks: complete and ready-to-use modules in C”.

3) Arnold S. Berger, “Embedded Systems Design: An Introduction to Processes, Tools and Techniques”

4) Introduction to Embedded Systems , Shibu K.V, Mc Graw Hill

5) Embedded System Design .Frank Vahid, Tony Givargis, John Wiley

IMCA 604 SEMINAR-I

This course is intended to make MCA students aware of the Current / Future trends related to Information Technology/ Computer Science/ Computer Application.
As such, a seminar report of not less than 15 pages is to be prepared and submitted for final evaluation.

The Seminar is to be evaluated internally by the College and carries a total Marks of 50 divided as follows:

1. Marks for relevance of topic and literature study (20)
2. Marks for Presentation – 2 presentations (20)
3. Marks for Seminar Report (10).

The seminar report should be prepared as per the following guidelines:

1. No of pages : Not less than 15 pages.
2. Size A4, One sided.
3. Text Size 12 ; Title Size 14 Underlined; Line spacing : 1.5 Full Justified
4. Spiral Binding with uniformity in bind cover.

Every student is expected to present a minimum of 2 presentation of the seminar before the evaluation committee and for each presentation marks can be equally apportioned. A three member committee consisting of qualified TEACHERS With PG in Computer Science / Computer Application from the MCA Department has to be appointed by HoD. The Committee duly appointed will evaluate the seminar. At the end of the semester the total marks have to be calculated and send to the University. A Student shall have to score 50 % for getting a pass in the Seminar

IMCA 605 SOFTWARE DEVELOPMENT PROJECT -1

The [IMCA 605] project is designed to help students develop practical ability and knowledge about practical tools/techniques in order to solve real life problems related to the industry, academic institutions and computer science research.

This course is one that involves practical work for understanding and solving problems in the field of computing. Any computer science project usually consists of the following: analysis, design, coding/implementation and testing of some information system or subsystem, such as, a piece of software. In this course we expect a software system or subsystem.

This course will also develop your investigative, research and report writing skills and will provide an opportunity for the candidate, to investigate a chosen topic in considerable depth.

This course provides the opportunity for students to demonstrate the application of their programming and research skills, and to apply their knowledge to complex computing problems.

Project Team

The project team should be organized and determined towards the fulfilment of their projects' objectives and tasks. A maximum of two students should work on a project, however, an individual student can also undertake the project on his/her own.

The main responsibilities of the project team/student are to:

• Ensure that an appropriate amount of time and effort is applied to the project,

• Ensure that they are responsive to the guidance of their counsellor,

• Acknowledge the text, material and ideas of others properly,

• Meet all milestones and regulations related to the work, and

• To communicate any problems that are likely to prejudice the quality or time lines of the work to the counsellor as and when problem arises.

Project Categories

Four broad areas / categories of computer science are given below, the candidate may select any of these category for Mini project.

• Application development

• Networking project

• System software

• Website development.

Semester VII

IMCA 701 PRINCIPLES OF MANAGEMENT & ACCOUNTING

MODULE I

Basic Managerial Concepts, Levels of management, Managerial Skills, Concept of management Principles, nature and need of management, management functions, management thought – classical approach, scientific management, Fayol's management, bureaucratic approach, systems approach, Contingency approach. Planning – Meaning, nature, structure, steps, effective planning, MBO, SWOT Analysis. Organizing – meaning, process, structure, formal and informal, types of organization, departmentation, delegation of authority.

MODULE II

Staffing – meaning, nature, staffing process, recruitment & selection. Directing, supervision, Motivation – significance, motivational theories- Maslow's need hierarchy, McGregor's Theory X & Theory Y. Leadership, Communication – formal and informal, Oral and written, barriers, effective communication. Controlling-concepts, steps, objectives, features of a good control system.

MODULE III

Organizational behavior – Key elements, scope, models of OB, Individual behavior, personality, attitudes values and job satisfaction, Group behavior, team building- Types, process, roles.

MODULE IV

Marketing Management-importance, scope. Core Marketing Concepts, Marketing research, Customer value, Customer relationship management, Brand Equity, Product Life Cycle, Pricing Strategies, Distribution Channels, Promotions – Sales promotions, advertising and public relations. Marketing Information System, Global marketing and Integration.

MODULE V

Management Accounting- concepts, functions, role, Financial Accounting, Principles of accounting, accounting concepts, double entry system, journal entry, posting, trial balance, subsidiary books, final accounts. Depreciation – meaning, methods of depreciation.

References

1. Principles of Management, R N Gupta, S.Chand& Company Ltd.
2. Essentials of Management – Koontz &Wheinrich, 7th Edition, PHI Publications
3. Global marketing management, Keegan, 7th Edition, PHI Publications
4. Marketing management – Kotler, Keller, Jha and Koshy, 13th edition, Pearson Education

5. Accounting for Management, Srinivasan &Murugan, S.Chand& Company Ltd
6. Organisational Behavior, S.S Khanka, S.Chand& Company Ltd
7. Principles of Management, L M Prasad, Sultan Chand Publications

IMCA 702 ANALYSIS & DESIGN OF ALGORITHMS

MODULE I

Introduction – Algorithms-design strategies-concepts in performance analysis – spacecomplexity, time complexity- asymptotic notation- practical complexities, performancemeasurement.

MODULE II

Divide and conquer method – General method, Finding the maximum and minimum,mergesort, Quick sort, Selection sort, Strassen's matrix multiplication.

MODULE III

Greedy Method and Dynamic programming method – The general method, Knapsack problem,Job sequencing with deadlines, Minimum cost spanning tree- prim's algorithm and kruskal'salgorithm, optimal storage on tapes. Dynamic programming- General method, multistagegraphs, All pairs shortest paths, The traveling salesperson problem.

MODULEIV

Backtracking and branch and bound techniques – The general method, The 8 queens problem,Sum of subsets. Branch and Bound- least cost search, control abstraction for LC search.

String Matching: Introduction, The naive string matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata, The Knuth-Morris-Pratt algorithm.

MODULE V

Lower bound theory and NP Hard problem – Comparison trees- searching, sorting andselection. Concepts of NP hard and NP-complete problems, non deterministicalgorithms,Classes of NP hard and NP complete. COOK'S theorem.

REFERENCES

- Fundamentals of computer algorithms- Ellis Horowitz, SartajSahni, SanguthevarRajeshekharan
- Fundamentals of algorithms – Gilles Brassard, Paul Bratley (PHI)
- Introduction to the design and analysis of algorithms – AnanyLevitin (Pearson)
- Computer algorithms – Introduction to design and analysis – Sara Baase, Allen VanGelder, (Pearson)
- Algorithm Design, Foundation, Analysis and Examples,Dr.Vijayakumar&Dr.Juby Mathew, Vimala Publications ,2016

IMCA 703 OBJECT ORIENTED PROGRAMMING THROUGH JAVA

MODULE I

Object Oriented Programming: Introduction to OOP's Paradigm, Characteristics of OOP's.
History and Basics of Java: Java's History and Creation, Java's Magic: Byte-code, ItsFeatures, Architecture of Java Virtual Machine, Importance of Java for the Internet, JDK,Java Editors (notepad++, eclipse, netbeans, jbuilder, bluej) Java Program Structure and Java'sClass Library, Java Data Types, Variables, and Operators, Operator Precedence. Scope ofVariables, Control Structure. **Array and String:** Declaration and Definition, String Handling Using String Class and itfunctions and Wrapper classes.

MODULE II

Introduction Classes: Fundamental of Classes & Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, Variable **this**, Overloading Methods.
Extending Classes and Inheritance: Fundamental of Inheritance, Using Existing Classes, Polymorphism, Multiple Levels of Inheritance, Super keyword, super-class constructor, Abstraction through Abstract Classes, Using Final Modifier.
Packages & Interfaces: Understanding Packages, Defining a Package, Packaging up YourClasses, Adding Classes from a Package to Your Program, Understanding CLASSPATH,Standard Packages, Access Protection in Packages, Concept of Interface, MultipleInheritance through Interfaces.

MODULE III

Exception Handling: The concept of Exceptions, Types of Exceptions, Dealing withExceptions, Exception Objects, Try and catch blocks, Try Defining Your Own Exceptions
Multithreading Programming: Understanding Threads, The Java Thread Model and lifecycle of thread, The Main Thread, Creating a Thread, Creating Multiple Threads, ThreadPriorities, Synchronization, Inter-thread communication, Deadlocks.
Input/ Output in Java: I/O Basic, Byte and Character Structures, I/O Classes, ReadingConsole Input Writing Console Output, Reading and Writing on Files, Random Access Files,Storing and Retrieving Objects from File, Stream Benefits.

MODULE IV

Creating Applets in Java: Applet Basics, Applet Architecture, Applet Life Cycle, SimpleApplet Display Methods, Requesting Repainting, Using The Status Window, The HTMLAPPLET Tag Passing Parameters to Applets.
Working with Windows Abstract Toolkit: AWT Classes, Window Fundamentals,Working with Frame, Creating a Frame Window in an Applet, Displaying Informationwithin a Window.

MODULE V

Working with Graphics, Controls and Text : Working with Graphics, Working withColor, Setting the Paint Mode, Working with Fonts, Managing Text Output Using FontMetrics, Exploring Text and **Controls:** Introduction, Adding and Removing Controls,Responding to Controls such that Label, Buttons, Checkboxes, Choice, Lists, Scroll Bar,Text Field, Text Area. **Graphics:** Working with AWT Controls, Layout Managers andMenus.

REFERENCES:

1. Object Oriented Programming With Java, Balagurusamy;
2. The Complete Reference JAVA by Herbert Schildt, TMH Publication.
3. Beginning JAVA, Ivor Horton, WROX Public.
4. JAVA 2 UNLEASHED, Tech Media Publications.
5. JAVA 2(1.3) API Documentations

IMCA 704 SOFTWARE ENGINEERING & PROJECT MANAGEMENT

MODULE I

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, SoftwareEngineering, The Software Process, Software Engineering Practice. Process Models: A Generic ProcessModel, Process Assessment and Improvement, Perspective Process Models, Specialized Process Models.

MODULE II

Understanding Requirements: Requirements Engineering, Eliciting Requirements, Developing Use Cases,Building the Requirements Model, Validating Requirements. Requirements Modeling: RequirementsAnalysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data ModelingConcepts, Class – Based Modeling. Software Engineering Project Management: Major issues of SoftwareEngineering, Functions and activities of Management, planning, organizing, staffing, directing andcontrolling a software Engineering Project. Project Evaluation: Strategic Assessment, technical assessment, Cost-benefit analysis, cash flow forecasting, cost-benefit evaluation techniques, Risk evaluation.

MODULE III

Selection of an appropriate project approach: Choosing Technologies, technical plan contents list,choice of process models, structure versus speed of delivery, The Waterfall model, The V-processmodel, the spiral model, Software prototyping, other ways of categorizing software prototypes.Controlling changes during prototyping, incremental delivery, dynamic systems development method,Extreme programming Managing iterative processes, selecting the most appropriate process model

MODULE IV

Software Effort Estimation: Problems with over and under estimates. The basis for Software estimating,Software effort estimation techniques, expert judgment, estimating by analogy, Albrecht function pointanalysis, function points Mark II, Object points, a procedural code –oriented approach, COCOMO: A Parametric Model.

MODULE V

Activity planning: The objectives of activity planning, When to plan, Project Schedules, Projects andactivities, Sequencing and scheduling activities, Network planning models, Formulating a network model,Adding the time dimension, Risk Management: The nature of risk, types of risks, Managing Risk, HazardIdentification, Hazard Analysis, Risk planning and control, Evaluating risks to the schedule.

REFERENCES

- Software Engineering – Roger S Pressman, 'Software Engineering: A Practitioner's Approach, 7thEdition, McGraw-Hill International Edition, 2010.
- Richard Fairey, 'Software Engineering concepts, Tata McGraw-Hill 2009 reprint
- Software Project Management by Bob Hughes and Mike Cotterell, Tata McGraw-Hill Edition 2004.
- Software Project Management- A unified framework by Walker Royce, Pearson Education, 2003.
- Software Engineering-a Practitioner's approach by Roger S Pressman, Sixth Edition, Tata McGraw Hill.
- Software Management By Donald J Reifer, Sixth Edition, Wiley-IEEE Computer Society Press, 2002.

IMCA 705 OBJECT ORIENTED ANALYSIS & DESIGN

MODULE-I

AN OVERVIEW OF OBJECT ORIENTED SYSTEMS DEVELOPMENT: Introduction, Two Orthogonal Views of the Software, Object Oriented Systems Development Methodology, Why an Object Orientation? WHY WE MODEL: The Importance of Modeling, Principles of Modeling, Object Oriented Modeling

INTRODUCING THE UML: An overview of the UML, A Conceptual Model of the UML, Architecture, Software Development Life Cycle

MODULE-II

BASIC STRUCTURAL MODELING: Classes, Relationships, Common Mechanisms, and diagrams, class diagrams ADVANCED STRUCTURAL MODELING: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

MODULE-III

BASIC BEHAVIORAL MODELING: Interactions, Interaction diagrams, Use cases, Use case diagrams, Activity Diagrams ADVANCED BEHAVIORAL MODELING: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

MODULE-IV (11 Lectures)

ARCHITECTURAL MODELING I: Component, Deployment, Component diagrams and Deployment diagrams ARCHITECTURAL MODELING II: Patterns and Frameworks, Collaborations, Systems and Models.

MODULE-V

CASE STUDY: Bank ATM Application, Railway Reservation System.

REFERENCES:

- Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", 2nd Edition, Pearson Education, 2007.
- Ali Bahrami, "Object Oriented Systems Development using the unified modeling language", 1stEdition, TMH, 2008.
- Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML", 1stEdition, Pearson Education, 2006.
- Pascal Roques, "Modeling Software Systems Using UML2", 1stEdition, WILEY Dreamtech, 2007.
- AtulKahate, "Object Oriented Analysis & Design", 1stEdition, TMH, 2007.
- Mark Priestley, "Practical Object-Oriented Design with UML", 2nd Edition, TMH, 2005.
- Craig Larman, "Appling UML and Patterns: An introduction to Object", Oriented Analysis and Design and Unified Process, 3rd Edition, Pearson Education, 2007.

IMCA 706 PHP PROGRAMMING PRACTICALS

Installing PHP, creating and working with variables, constants, PHPs Internal Data Types;

Math Operators, Assignment Operators, String Operators, Bitwise Operators, Comparison Operators, Logical Operators;

Using the IF Statement, else Statement, elseif, ternary operator, switch statement, while loops, do..while loops, foreach loop;

String functions, formatting text strings, arrays, handling arrays with Loops

Sorting Arrays; Array Operators; Multidimensional Arrays;

Functions in PHP, passing arrays to functions, passing by reference, returning arrays, introducing variable scope in PHP, Conditional Functions, Nesting functions, Variable Functions;

Setting Webpages to communicate with PHP; Handling text fields, text areas, check boxes, radio buttons, list boxes, password controls, image maps, buttons, File uploads;

PHP server variables, HTTP Headers

Obect oriented Programming – creating classes, objects, setting access, Constructors, Inheritance, Overloading, Autoloading Classes

Static Methods, Creating Abstract Classes, Interfaces, FINAL Keyword;

File handling – fopen, feof, fgets, closing a file, fgetc, f_get_contents, file_exists, filesize, fread, fscanf, fseek, copying files, fwrite, reading and writing binary files, appending to files

Working with Database – MySQL Database, Connecting to the database server and database, displaying the table data, updating databases, inserting new data into database, creating new tables, deleting records, sorting the data.

Sessions and cookies – Setting a cookie, reading a cookie, working with ftp, downloading files with ftp, uploading and deleting files with ftp, sending email, writing a hit counter using sessions;

Implement the above concepts using 50 programs in the Lab Cycle and a small project connecting a website developed in PHP with a database created using MySQL.

References:

- The complete reference PHP, McGraw Hill Education, Holzner;
- PHP Programming, Penn Wu,
- Object oriented PHP, Peter Lavin
- Modern PHP, Josh Lockhart

IMCA707 OOPS THROUGH JAVA PRACTICALS

All students are expected to develop 50 Programs (simple and complex) which will demonstrate the theoretical concepts studied in the Java Theory paper of MCA.

- Programs to illustrate class, objects and constructors
- Programs to implement overloading, overriding, polymorphism etc
- Programs to implement the usage of packages
- Programs to create our own exception
- Programs for handling file operation
- Implement the concept of thread Programming
- Programs to implement Generic class and generic methods
- Applet Programs for passing parameters
- Applet Programs for running an audio file
- Programs for event-driven paradigm in Java
- Event driven Programs for Graphical Drawing Application
- Programs that uses Menu driven Application
- Programs to implement JDBC in GUI and Console Application
- Web page design using HTML and client side validation using Java-script
- Programs to implement session Handling and Cookies in Servlets and JSP
- Socket Programming to implement communications
- Develop a multi-threaded GUI application of your choice.

Semester VIII

IMCA 801 SYSTEM SOFTWARE

MODULE I

FINITE AUTOMATA- Introduction- Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions– Finite Automaton – DFA &NDFA – Regular languages-Regular Expression – Equivalence of NFA and DFA — Equivalence of finite Automaton and regular expressions –Minimization of DFA- – Pumping Lemma for Regular sets.Grammar- Types of Grammar – Context Free Grammars and Languages– Derivations andLanguages.

Turing Machines -Definitions of Turing machines – Models – Computable languages and functions –Techniques for Turingmachine construction – Multi head and Multi tape Turing Machines

MODULE II

INTRODUCTION - System software and machine architecture - The Simplified Instructional Computer (SIC) Machine architecture - Data and instruction formats - addressing modes - Instruction sets - I/O and programming.

MODULE III

ASSEMBLERS - Basic assembler functions- A simple SIC assembler –Assembler algorithm and data structures -Machine dependent assembler features -Instruction formats and addressing modes –Program relocation -Machine independent assembler features -Literals –Symbol-defining statements –Expressions -One pass assemblers and Multi pass assemblers - Implementation example -MASM assembler.

MODULE IV

LOADERS AND LINKERS- Basic loader functions-Design of an Absolute Loader –A Simple Bootstrap Loader -Machine dependent loader features -Relocation –Program Linking – Algorithm and Data Structures for Linking Loader -Machine-independent loader features - Automatic Library Search –Loader Options -Loader design options -Linkage editors –Dynamic Linking –Bootstrap Loaders -Implementation example- MSDOS linker.

MODULE V

MACRO PROCESSORS- Basic macro processor functions -Macro Definition and Expansion – Macro Processor Algorithm and data structures -Machine-independent macro processor features -Concatenation of Macro Parameters –Generation of Unique Labels –Conditional Macro Expansion –Keyword Macro Parameters-Macro within Macro.

SYSTEM SOFTWARE TOOLS- Text editors -Overview of the Editing Process -User Interface –Editor Structure. -Interactive debugging systems-Debugging functions and capabilities – Relationship with other parts of the system –User-Interface Criteria

REFERENCES

- Leland L. Beck, "System Software – An Introduction to Systems Programming", Pearson Education Asia.
- D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill.
- John J. Donovan "Systems Programming", Tata McGraw - Hill Edition.
- Mishra K L P and Chandrasekaran N, "Theory of Computer Science – Automata, Languages and Computation", Third Edition, Prentice Hall of India
- Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", Second Edition, Prentice Hall of India, Pearson Education, New Delhi.
- Peter Linz, "An Introduction to Formal Language and Automata", Third Edition, Narosa Publishers, New Delhi.

IMCA 802 DATA MINING

MODULE I

Introduction to Data mining & Date Warehouse

What is Data mining, Data mining -On What kinds of Data, Data mining Functionalities, Classification of Data mining Systems, Data Mining Task Primitives, Integration of Data mining systems, Major issues of Data mining, What is Data Warehouse, Multidimensional Data Model, A three-tier Data Warehousing Architecture.

MODULE II

Data Preprocessing and Mining Frequent Patterns

Data Preprocessing; Data Cleaning, Data Integration and Transformation, Data Reduction, Data discretization and concept hierarchy generation.

Association Rules

Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods **:**Apriori Algorithm, Generating association Rules from Frequent Item sets, improving the Efficiency of Apriori. Mining Frequent item-sets without Candidate Generation.

MODULE III

Classification and Prediction

Introduction to Classification and Prediction, Issues Regarding Classification and Prediction

Classification by Decision Tree Induction: Decision Tree induction, Attribute Selection Measures,Tree Pruning, **Bayesian Classification**: Bayes' theorem, Naïve Bayesian Classification, **Rule Based Algorithms**: Using If - Then rules of Classification, Rule Extraction from a Decision Tree, Rule Induction Using a Sequential Covering algorithm, **K- Nearest Neighbour Classifiers.**

Prediction : Linear Regression, Nonlinear Regression, Other Regression-Based Methods

MODULE IV

Clustering

What is Cluster Analysis, Requirements of Cluster Analysis' Types of Data in Cluster Analysis,

Categorization of Major Clustering Methods, **Partitioning Methods** :k-Means and k- Medoids, From KMedoids to CLARANS , **Hierarchical Method** : Agglomerative and Divisive Hierarchical Clustering, BIRCH, ROCK, Chameleon, **Density–Based Method**: DBSCAN, **Grid Based Methods:** STING: STatisticalINformation Grid, Wave Cluster, **Model based Methods-** Expectation-Maximization, Conceptual Clustering, Neural Network Approach.

MODULE V

Applications and Trends in Data Mining

Data Mining Applications : Data Mining for Financial Data Analysis, Data Mining for the Retail

Industry, Data Mining for the Telecommunication Industry, Data Mining for Biological Data Analysis, Data Mining in Other Scientific Applications, Data Mining for Intrusion Detection, Social Impacts of Data Mining, Trends in Data Mining.

References

- Data Mining Concepts and Techniques – Jiawei Han and MichelineKamber, Second Edition,Elsevier, 2006
- Data Mining – BPB Editorial Board, BPB Publications, First Edition, 2004
- Data Warehousing, Data Mining, & OLAP – Alex Berson, Stephen Smith, TMHill,2004
- Data Warehousing, Sinha, Thomson Learning

IMCA 803 TCP/IP PROTOCOLS

MODULE I

Introduction, Arpanet, TCP/IP Protocol, Protocols and Standards, Internet Administration, Protocol Layers, OSI Model, TCP/IP Model, Addressing; Wired LAN, Wireless LAN, Point – to point WAN, Switched WAN;Network Layer – Switching, Connection Oriented and Connection Less Service, Network Layer Services, Error Control, Flow Control, Congestion Control, QoS;

MODULE II

Addressing, Classful Addressing, Classless Addressing, Special Addresses, NAT; Delivery of Packets, Forwarding based on Destination Address, Forwarding based on Labels, Structure of a router;ARP- Address Mapping, The ARP Protocol, ATMARP, ARP Package; ICMP – Messages, Debugging Tools, ICMP Package;

Mobile IP- Addressing, Agents, Three Phases, Inefficiency in Mobile IP;

MODULE III

Unicasting, Intra and Inter Domain Routing, Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP; Multicasting – Introduction, Multicast Addresses, IGMP, Multicast routing, Routing Protocols – Multicast Link State Routing, Multicast Distance Vector,DVMRP, CBT, PIM; Transport Layer Services; Transport layer protocols, UDP, UDP Services, UDP Applications

MODULE IV

TCP Services, Segment, State Transition Diagrams, flow Control, Error Control, Congestion Control; Client Server paradigm, Peer to Peer paradigm; DNS, DNS Resolution, Messages, Types of records;

MODULE V

TELNET, SSH, FTP, TFTP, HTTP, SMTP; IPv6 Addressing, IPv6 Protocols;

REFERENCES

- TCP/IP Protocol Suite, FOROUZAN, McGraw Hill International Edition;
- TCP/IP Illustrated: The Protocols, Fall & Stevens;
- TCP/IP, The Ultimate Protocol Guide, Universal Publishers;
- TCP/IP foundations, Andrew Blank, Wiley Publishers

IMCA 804 LINUX OS AND SHELL PROGRAMMING

MODULE I

Introduction to Linux - History, Architecture, Comparison with UNIX, Features and Facilitiesof Linux, Basic commands in Linux, Files and File Structure - Linux File System, Boot block, Super block, Inode table, Data blocks, Linux standard directories. File naming Conventions,Path, Types of file names and Users, File Commands in Linux, file comparisons, DirectoryCommands, Text Editors-Functions of a Text Editor, vi Editor, Locating Files, File AccessPermissions [FAP], Viewing and Changing FAPs, Redirection, Filters, Pipes.

MODULE II

Basics of shell programming, various types of shell available in Linux, comparisons betweenvarious shells, shell programming in bash - Conditional and looping statements, Iterations,Command Substitution - expr command, arithmetic expansion, parameter passing

andarguments, Shell variables, system shell variables, shell keywords, Creating Shell programs forautomating system tasks.

MODULE III

Common administrative tasks, identifying administrative files configuration and log files,Role of system administrator, Managing user accounts-adding &deleting users, changingpermissions and ownerships, Creating and managing groups, modifying group attributes,Temporary disabling of users accounts, creating and mounting file system.

MODULE IV

Checking and monitoring system performance - file security &Permissions, becoming superuser using su. Getting system information with uname, host name, disk partitions &sizes,users, kernel. Installing and removing packages. Backup, restore and Compress utilities - tar,cpio, dump,rsync and restore utilities.

MODULE V

Communication in Linux - mesg, who- T, talk, write, wall, finger, chfn, ping, tracerouteutilities, email facilities . Configuration of servers- Telnet, FTP, DHCP,NFS, SSH, ProxyServer(Squid), Web server (Apache), Samba. Daemons- init, crond, atd, xinetd, inetd, theservices file. named, sshd, httpd.

REFERENCES

- Operating System - Linux, NIIT Press, PHI Publisher, 2006 Edition
- Red Hat Linux Bible, Cristopher Negus, Wiley Dreamtech India
- UNIX Shell Programming by YeswantKanetkar, BPB
- Linux Administration Handbook, EviNemeth,Garth Snyder, Trent KHein– PearsonEducation.
- Beginning Linux Programming by Neil Mathew & Richard Stones, Wiley Dreamtech

IMCA 805 ELECTIVE I

LIST OF ELECTIVES FOR SEMESTER 8

1. E1 – MICROPROCESSORS AND EMBEDDED SYSTEMS

2. **E2 – BIG DATA ANALYTICS**

3. **E3 – CLOUD AND GRID COMPUTING**

4. **E4 – SOCIAL NETWORK ANALYSIS**

5. **E5 – CRYPTOGRAPHY AND COMPUTER SECURITY**

6. **E6 – SOFT COMPUTING**

Every Student is supposed to take one elective paper in Semester 4 as part of the MCA course. Examinations will be conducted for the selected paper by the University with both internal and external components like other core papers.

IMCA 805 E1 - MICROPROCESSORS AND EMBEDDED SYSTEMS

MODULE I

The Processors : 8086 - Register Organization of 8086, Architecture, Signal Description of 8086, Physical Memory Organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum Mode 8086 System and Timings, Maximum Mode 8086 System and Timings. Addressing Modes of 8086.

MODULE II

Instruction Set, Assembler Directives and Assembly Language Programming of 8086 - Machine Language Instruction Formats – Instruction Set of 8086-Data transfer instructions, Arithmetic and Logic instructions, Branch instructions, Loop instructions, Processor Control instructions, Flag Manipulation instructions, Shift and Rotate instructions ,String instructions, Assembler Directives and operators, Example Programs**,** Introduction to Stack, STACK Structure of 8086, Interrupts and Interrupt Service Routines, Interrupt Cycle of 8086, Non-Maskable and Maskable Interrupts, Interrupt Programming, MACROS.

MODULE III

Special Purpose Programmable Devices and their Interfacing - Data transfer schemes-programmed I/O, Interrupt I/O, DMA, DMA Controller 8257,Programmable Interval Timer 8253, Programmable Interrupt Controller 8259A, Programmable Communication Interface 8251 USART, Programmable Peripheral Interface 8255.

MODULE IV

Architecture and Comparison of various Processors - 80186,80286,80386,80486, Pentium Processors, Case Study on Advanced Multiprocessors

MODULE V

Introduction to Embedded Systems .

Embedded system – classification, Hardware Components of an Embedded system.Microcontrollers 8051 – Introduction, Architecture, Memory Organization, Instruction Set – Programming.

References

- Advanced Microprocessors and Peripherals – Architecture, Programming and Interfacing by A.K. Ray and K.M. Bhurchand, Tata McGraw Hill,2002 Edition
- Embedded Systems – Architecture, Programming & Design by Raj Kamal -Tata McGraw Hill.
- The Intel Microprocessors 8086/8088, 80816/80188, 80286, 80486 Pentium and Pentium Pro Processor – Architecture, Programming and interfacing by Brey, 4th Edition, PHI.
- Microprocessors and Interfacing – Programming and Hardware by Douglas V Hall, 2nd Edition, Tata McGraw Hill, 2002.
- Microprocessor x86 Programming by K.R. Venugopal and Raj Kumar – BPB publications
- Micro Controllers – [Theory And Applications] by Ajay V. Deshmukh- Tata McGraw Hill.

IMCA 805 E2 - BIG DATA ANALYTICS

MODULE 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 .

MODULE II

NOSQL DATA MANAGEMENT - Introduction to NoSQL – aggregate data models – aggregates – key-value and document data models – relationships – graph databases – schemaless databases – materialized views – distribution models – sharding – master-slave replication – peer-peer replication – sharding and replication – consistency – relaxing consistency – version stamps – mapreduce – partitioning and combining – composing map-reduce calculations.

MODULE 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 – compression – serialization – Avro – file-based data structures

MODULE IV

MAPREDUCE APPLICATIONS- MapReduce workflows – unit tests with MRUnit – test data and local tests – anatomy of MapReduce 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

MODULE V

HADOOP RELATED TOOLS 9 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 Pig Latin scripts. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.

REFERENCES

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

IMCA 805 E 3- CLOUD AND GRID COMPUTING

MODULE I

Cloud Computing Basics-Overview, Applications, Intranets and the Cloud, Hardware and Infrastructure-Clients, Security, Network, Services. Software as a Service (Saas)- Understanding the Multitenant Nature of SaaS Solutions, Understanding SOA. Platform as a Service (PaaS), Benefits of Paas Solutions,

Disadvantages of Paas Solutions. Infrastructure as a Service (Iaas)-Understanding IaaS, Improving Performance through Load Balancing, System and Storage Redundancy, Utilizing Cloud-Based NAS Devices, Advantages, Server Types. Identity as a Service (IDaaS)- Understanding Single Sign-On (SSO), OpenID, Mobile ID Management. Cloud Storage-Overview, Cloud Storage Providers.

MODULE II

Virtualization-Understanding Virtualization, History, Leveraging Blade Servers, Server Virtualization, Data Storage Virtualization. Securing the Cloud- General Security Advantages of Cloud-Based Solutions, Introducing Business Continuity and Disaster Recovery. Disaster Recovery- Understanding the Threats.

MODULE III

Service Oriented Architecture-Understanding SOA, Web Services Are Not Web Pages, Understanding Web Service Performance, Reuse and Interoperability. Developing Applications-Google, Microsoft, Cast Iron Cloud, Bungee Connect, Development. Migrating to the Cloud-Cloud Services for Individuals, Cloud Services Aimed at the Mid-Market, Enterprise-Class Cloud Offerings, and Migration. Designing Cloud Based Solutions-System Requirements, Design Is a Give-and-Take Process. Coding Cloud Based Applications-Creating a Simple Yahoo Pipe, Using Google App Engine and creating a Windows Azure Application.

MODULE IV

Grid Computing: Introduction - Definition -Scope of grid computing. Grid computing model - Grid.Protocols – Desktop grids: Characteristics – key elements – Role in enterprise computing infrastructure. Data grids: Avaki Data Grid – Data grid Architecture. Grid Computing Initiatives: Grid Computing Organizations and their roles – Grid Computing anatomy – Grid Computing road map. Grid Computing Applications: Merging the Grid services architecture with the Web Services Architecture.

MODULE V

Technologies: OGSA – Sample use cases – OGSA platform components – OGSI – OGSA Basic Services. Managing Grid Environments: Managing grids – management reporting – monitoring – service level management – data catalogs and replica management.

REFERENCES

- Joshy Joseph & Craig Fellenstein, “Grid Computing”, PHI, PTR-2003.
- Ahmar Abbas, “Grid Computing: A Practical Guide to technology and Applications”,Charles, River media – 2003.
- Fran Bermn, Geoffrey Fox, Anthony Hey J.G., “Grid Computing: Making the GlobalInfrastructure a Reality”, Wiley, USA, 2003
- Maozhen Li, Mark Baker, “The Grid: Core Technologies”, John Wiley &Sons, 2005.
- Cloud Computing : A Practical Approach by Anthony T. Velte Toby J.Velte, Robert Elsenpeter, 2010, The McGraw-Hill.
- Cloud Computing Bible by Barrie Sosinsky, Published by Wiley Publishing, 2011.

IMCA 805 E 4 - SOCIAL NETWORK ANALYSIS

MODULE I INTRODUCTION

Introduction to Semantic Web: Limitations of current Web – Development of Semantic Web – Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis – Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Web-based networks – Applications of Social Network Analysis.

MODULE II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework – Web Ontology Language – Modelling and aggregating social network data: State-of-the-art in network data representation – Ontological representation of social individuals – Ontological representation of social relationships – Aggregating and reasoning with social network data – Advanced representations.

MODULE III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

Extracting evolution of Web Community from a Series of Web Archive – Detecting communities in social networks – Definition of community – Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms – Tools for detecting communities social network infrastructures and communities – Decentralized online social networks – Multi – Relational characterization of dynamic social network communities.

MODULE IV - PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

Understanding and predicting human behaviour for social communities – User data management – Inference and Distribution – Enabling new human experiences – Reality mining – Context – Awareness – Privacy in online social networks – Trust in online environment – Trust models based on subjective logic – Trust network analysis – Trust transitivity analysis – Combining trust and reputation – Trust derivation based on trust comparisons – Attack spectrum and countermeasures.

MODULE V -VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS Graph theory – Centrality – Clustering – Node-Edge Diagrams – Matrix representation – Visualizing online social networks, Visualizing social networks with matrix-based representations – Matrix and Node-Link Diagrams – Hybrid representations – Applications – Cover networks – Community welfare – Collaboration networks – Co-Citation networks.

REFERENCE BOOKS

- Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer 2007. BorkoFurht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.
- GuandongXu ,Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition Springer, 2011.
- Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
- John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

IMCA 805 E 5–CRYPTOGRAPHY AND COMPUTER SECURITY

MODULE I

Foundations of Cryptography and Security – Ciphers and Secret Messages, Security Attacks and Services, Mathematical Tools for Cryptography, Substitutions and Permutations, Modular Arithmetic, Euclid's Algorithm, Finite Fields, Polynomial Arithmetic, Discrete Logarithms, Conventional Symmetric Encryption Algorithms, Theory of Block Cipher Design, Feistel Cipher Network Structures, DES and Triple DES, Strength of DES.

MODULE II

Modern Symmetric Encryption Algorithms, IDEA, CAST, Blowfish, Twofish, RC2, RC5, Rijndael (AES), Key Distribution, Stream Ciphers and Pseudo Random Numbers, Pseudo Random Sequences, Linear Congruential Generators, Cryptographic Generators, Design of Stream Cipher, One Time Pad.

MODULE III

Public Key Cryptography – Prime Numbers and Testing for Primality, Factoring Large Numbers, RSA, Diffie-Hellman, ElGamal, Key Excahnge Algorithms, Public-Key Cryptography Standards

MODULE IV

Hashes and Message Digests – Message Authentication, MD5, SHA, RIPEMD, HMAC, Digital Signatures, Certificates, User Authentication, Digital Signature Standard, Security Handshake Pitfalls, Elliptic Curve Cryptosystems.

MODULE V

Authentication of Systems, Kerberos, Electronic Mail Security, Pretty Good Privacy, IP and Web Security, Secure Sockets and Transport Layer, Electronic Commerce Security, electronic Payment Systems, Secure Electronic Transaction, Digital Watermarking.

REFERENCES

- Behrouz A Forouzan, Cryptography and Network Security, Tata McGraw Hill, 2005
- William Stalings, Cryptography and Network Security, Principles and Practices. 6th, Edition, Pearson Education, 2005.
- Menezes, Network Security and Cryptography, Cengage Learning

IMCA 805 E 6 - SOFT COMPUTING

MODULE I

Introduction to Neuro, Fuzzy and Soft Computing, Fuzzy Sets, Basic Fuzzy Set Operations, Properties of Fuzzy Sets ,Fuzzy Relations – Operations on Fuzzy Relations , Properties, Membership Functions, Fuzzification, Defuzzification Methods. Fuzzy If-Then Rules, Fuzzy Reasoning , Fuzzy Inference Systems, Mamdani Fuzzy Models, Sugeno Fuzzy Models.

MODULE II

Artificial Neuron, Activation Functions, Training an Artificial Neural Net work- Supervised, Unsupervised, Reinforsed Training, Single and multi layer networks, Basic learning laws, Perceptron convergence, Back Propogation Network, Associative memory, Competitive Learning, Self organizing neural networks- Kohonenself organizing Maps

MODULE III

Difference between Traditional Algorithms and GA, The basic concepts, creation of offspring, working principles, Encoding , Fitness function, Reproduction , Cross Over, Mutation, Convergence Theory, Applications.

MODULE IV

Evolutionary Computing, Simulated Annealing, Particle Swarm optimization, Real to Artificial Ants, Ant colony optimization, Ant Colony Optimization Algorithms for the Traveling Salesman Problem

MODULE V

Hybrid Systems: Neural-Network-Based Fuzzy Systems, Fuzzy Logic-Based Neural Networks, Genetic Algorithm for Neural Network Design and Learning, Fuzzy Logic and Genetic Algorithm for Optimization, Applications.

REFERENCES

- Neuro-Fuzzy and Soft Computing, Jang, Sun, &Mizutani, PHI.
- S. N. Sivanandan and S. N. Deepa , Principles of Soft Computing , Wiley India 2 nd Ed, 2011.
- S. Rajasekaran& GA VijayalakshmiPai "Neural Networks, Fuzzy Logic, and Genetic Algorithms synthesis and application", PHI
- S.N.Sivanandam · S.N.Deepa, "Introduction to Genetic Algorithms", Springer, 2007.
- Neural Networks, S. Haykin, Pearson Education, 2ed, 2001.
- James F. Kennedy, Russell C. Eberhart, Swarm intelligence, Morgan Kaufman, 2001
- Introduction To Evolutionary Computing, A.E.Eiben,J.E.Smith, Springer 2003.

IMCA 806 LINUX OS & SHELL PROGRAMMING PRACTICALS

Develop Programs to demonstrate the following concepts

Installation of Linux, network based installation,

Basic Overview of various commands- cal, pwd, cd, ls, mv, cd, cp, rm, mkdir, rmdir, more, less,touch.

Creating and viewing files using cat, file comparisons, disk related commands, checkingdisk free spaces.

Batch commands, kill, ps, who, Printing commands, find, sort, touch, file, fileprocessing commands- wc, cut, paste etc . mathematical commands - expr, factor etc.

Filtercommands- pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed, awk.

Shell Programming -Shells, Scripting Rationale Creating a bash Script, bash Start up Files, AScript's Environment, Exporting Variables, Exit Status, Programming the Shell, ParameterPassing, Operators, looping, Input and Output.

Process Management with Linux, File System management, User Administration, Linux Start upand Shutdown, Software package Management

Network AdministrationLAN Card configuration, Server Configuration- DHCP, DNS, FTP, Telnet, SSH, NFS, WebServer, SQUID Proxy server.

References

- Operating System - Linux, NUT Press, PHI Publisher, 2006 Edition
- Red Hat Linux Bible, Cristopher Negus, Wiley Dreamtech India
- UNIX Shell Programming by YeswantKanetkar, BPB
- Linux Administration Handbook, EviNemeth,Garth Snyder, Trent KHein– Pearsoneducation.
- Beginning Linux Programming by Neil Mathew & Richard Stones, Wiley DreamtechIndia

IMCA807 MINI PROJECT – APPLICATION DEVELOPMENT

The mini project is designed to help students develop practical ability and knowledge about practical tools/techniques in order to solve real life problems related to the industry, academic institutions and computer science research.

The course Mini Project is one that involves practical work for understanding and solving problems in the field of computing. Any computer science project usually consists of the following: **analysis, design, coding/implementation and testing** of some information system or subsystem, such as, a piece of software. In this course we expect a software system or subsystem.

This course will also develop your investigative, research and report writing skills and will provide an opportunity for you, to investigate a chosen topic in considerable depth. Mini Project provides the opportunity for students to demonstrate the application of their programming and research skills, and to apply their knowledge to complex computing problems.

Project Team

The project team should be organized and determined towards the fulfilment of their projects' objectives and tasks. A maximum of two students should work on a project, however, an individual student can also undertake the project on his/her own.

The main responsibilities of the project team/student are to:

- Ensure that an appropriate amount of time and effort is applied to the project,
- Ensure that they are responsive to the guidance of their counsellor,
- Acknowledge the text, material and ideas of others properly,
- Meet all milestones and regulations related to the work, and

• To communicate any problems that are likely to prejudice the quality or time lines of the work to the counsellor as and when such problems arise.

Project Categories

Four broad areas / categories of computer science are given below, so that you can select any of these category for your Mini project.

• Application development

• Networking project

• System software

• Website development.

Semester IX

IMCA 901 USER INTERFACE DESIGN

MODULE I Introduction
Introduction-Importance-Human-Computer interface-characteristics of graphical and web user interface-advantages and disadvantages of graphical systems-characteristics of GUI - web user interface- popularity-characteristics of Web interface-internet-intranet-extranet-principles of UID

MODULE II Human Computer Interaction
User interface design process- obstacles-usability-Creating graphical systems-Know your user client-human characteristics in design-Understand the business functions-requirement analysis-Direct-Indirect methods-basic business functions-Design standards-system trainings–Understand the principles of good screen design-Human consideration in screen design-Develop System Menus and Navigation Schemes-structures of menus - functions of menus-contents of menu-formatting - phrasing the menu - selecting menu choice-navigating menus-graphical menus.

MODULE III Windows
Windows: Characteristics-components-presentationstyles-types-managements Organizations-Operations-web systems-device-based controls: characteristics-Screen-based Controls: operate control-text boxes-selection control-combination control-custom control presentation Control.

MODULE IV - Multimedia
Write clear text and messages-Text for web pages - effective feedback-guidance & assistance-Internationalization accessibility-Icons-Image - Multimedia -coloring.

MODULE V Windows Layout - Test
Windows layout-test: prototypes - kinds of tests - retest - Information search - Visualization - Hypermedia - www - Software tools.

References

1. Wilbent. O. Galitz ,“The Essential Guide to User Interface Design”, John Wiley& Sons, 2001.
2. Ben Sheiderman, “Design the User Interface”, Pearson Education, 1998.
3. Alan Cooper, “The Essential of User Interface Design”, Wiley – Dream Tech Ltd., 2002.

IMCA 902 KNOWLEDGE MANAGEMENT AND BUSINESS INTELLIGENCE

MODULE - I

Basics - What is Knowledge Management? - Key Challenges - KM Life Cycle - Understanding Knowledge – Definitions - Cognition and Knowledge Management - Data, Information, and Knowledge - Types of Knowledge - Expert Knowledge.

MODULE - II

Knowledge Management System Life Cycle - Challenges in Building KM Systems - Conventional Versus KM System Life Cycle - KM System Life Cycle - System Justification - Role of Rapid Prototyping - Role of Knowledge Developer – User Training.

MODULE - III

Knowledge Creation - Nonaka's Model of Knowledge Creation and Transformation - Knowledge Architecture - Capturing Tacit Knowledge – Evaluating the Expert – Developing a relationship with Expert – Interview as a tool – Brainstorming – Repertory Grid - NominalGroup Techniques(NGT) – Delphi method – Concept mapping Knowledge Codification - Codification Tools and Procedures - Knowledge Developers Skill Set - Knowledge Transfer - Transfer Methods - Portals Basics - Business Challenge - Knowledge Portal Technologies - Ethical and Legal Issues - Knowledge Owners - Legal Issues.

MODULE - IV

Changing Business Environments and Computerized Decision Support - A Framework for Business Intelligence - Intelligence Creation and Use and BI Governance - Transaction Processing versus Analytic Processing - Successful BI Implementation - Major Tools and Techniques of Business Intelligence.

MODULE - V

Implementing BI: An Overview - BI and Integration Implementation - Connecting BI Systems to Databases and Other Enterprise Systems - On-Demand BI - Issues of Legality, Privacy, and Ethics - Emerging Topics in BI: An Overview - The Web 2.0 Revolution - Online Social Networking: Basics and Examples - Virtual Worlds - Social Networks and BI: Collaborative Decision Making - RFID and New BI Application Opportunities - Reality Mining.

REFERENCES:

1. Elias M.Awad, Hassan M.Ghaziri,"Knowledge Management", Pearson Education, 2004, (For Units I, II and III).

2. Efraim Turban, Ramesh Sharda, DursunDelen and David King, "Business Intelligence" 2 nd Edition, 2010. (For Unit IV – Chapter 1, Unit – V -Chapter 6)03

IMCA 903 ENTERPRISE RESOURCE PLANNING

MODULE I

INTRODUCTION - Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional integrated ERP systems.

MODULE II

ERP SOLUTIONS AND FUNCTIONAL MODULES - Overview of ERP software solutions- Small, medium and large enterprise vendor solutions, BPR, and best business practices - Business process Management, Functional modules.

MODULE III

ERP IMPLEMENTATION - Planning Evaluation and selection of ERP systems - Implementation life cycle - ERP implementation, Methodology and Frame work- Training – Data Migration. People Organization in implementation-Consultants, Vendors and Employees.

MODULE IV

POST IMPLEMENTATION - Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of ERP Implementation.

MODULE V

EMERGING TRENDS ON ERP - Extended ERP systems and ERP add-ons -CRM, SCM, Business analytics - Future trends in ERP systems-web enabled, Wireless technologies, cloud computing.

Case studies on ERP Systems used in Industries/Organizations

REFERENCES

1. Sinha P. Magal and Jeffery Word, Essentials of Business Process and Information System, Wiley India, 2012

2. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008

3. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.

4. MahadeoJaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009

5. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2006.

6. Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2008.

IMCA 904 ADVANCED JAVA PROGRAMMING

MODULE I - JAVA FUNDAMENTALS

Java I/O streaming – filter and pipe streams – Byte Code interpretation - Threading – Swing.

MODULE II NETWORK PROGRAMMING IN JAVA

Sockets – secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes – Reading Data from the server – writing data – configuring the connection – Reading the header – telnet application – Java Messaging services

MODULE III APPLICATIONS IN DISTRIBUTED ENVIRONMENT

Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming Services – CORBA programming Models - JAR file creation

MODULE IV MULTI-TIER APPLICATION DEVELOPMENT

Server side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication - JDBC – Applications on databases – Multimedia streaming applications – Java Media Framework.

MODULE V ENTERPRISE APPLICATIONS

Server Side Component Architecture – Introduction to J2EE – Session Beans – Entity Beans – Persistent Entity Beans.

REFERENCES:

- Elliotte Rusty Harold, " Java Network Programming", O'Reilly publishers, 2000 (MODULE II)
- Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999. (MODULE III and MODULE V)

- Hortsmann& Cornell, "CORE JAVA vol. 2 ADVANCED FEATURES, VOL II", Pearson Education, 2002. (MODULE I and MODULE IV)
- Web reference: http://java.sun.com. 2. Patrick Naughton, "COMPLETE REFERENCE: JAVA2", Tata McGraw-Hill, 2003.

IMCA 905 ELECTIVE II

LIST OF ELECTIVES FOR SEMESTER 9

1. **E1 – ADHOC AND SENSOR NETWORKS**
2. **E2 – MULTIMEDIA SYSTEMS**
3. **E3 – INFORMATION SECURITY AND E-COMMERCE**
4. **E4 – DIGITAL IMAGE PROCESSING**
5. **E5 – DISTRIBUTED COMPUTING**
6. **E6 – COMPUTER GRAPHICS WITH OPENGL**

Every Student is supposed to take one elective paper in Semester 5 as part of the MCA course. Examinations will be conducted for the selected paper by the University with both internal and external components like other core papers.

IMCA 905E1 - ADHOC AND SENSOR NETWORKS

MODULE - 1

Fundamentals of Wireless Communication Technology –Routing in Ad Hoc Networks, Broadcasting, Multicasting and Geocasting-mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures. Applications of Ad Hoc and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.. Routing in Wireless Networks: proactive routing, reactive routing (on demand), hybrid routing, power-aware routing, Agent-based routing, random walk, trace routing

MODULE - II

TCP over mobile ad hoc networks: IP address acquisition, effects of partitions on TCP, provisions for mobility and fairness. Issues in designing a MAC Protocol- Classification of MAC Protocols-Contention based protocols- Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11,Network simulators

MODULE -III

Issues in designing a routing and Transport Layer protocol for Ad hoc networks-. Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.. WSN Clock Synchronization: clustering for synchronization, sender-receiver and receiver-receiver synchronization. Error analysis. WSN Node Localization: absolute and relative localization, triangulation, multi-hop localization and error analysis, anchoring, geographic localization.

MODULE - IV

Hybrid wireless networks and wireless sensor networks: Architectures and routing protocols for hybrid wireless networks; Load balancing schemes; Pricing schemes for multihop wireless Networks, Single node architecture: hardware and software components of a sensor node – WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4

MODULE - V

Recent advances in wireless networks Wide Band (UWB) communication; Issues and challenges in UWB communication; Applications of UWB communication; Wireless Fidelity (Wi-Fi) systems; Issues in Wi-Fi Systems; Pricing/billing in Wi-Fi systems; Multimode 802.11; Optical wireless communications; Optical Wireless Wavelength Division Multiplexing (OWWDM). Security in Ad Hoc and Sensor Networks, Integrating MANETs, WLANs and Cellular Networks

References

- Carlos de MoraisCordeiro and Dharma Prakash Agrawal, “Ad Hoc and Sensor Networks : Theory and Applications”, Second Edition, World Scientific Publishers, 2011
- PrasantMohapatra and Sriramamurtyhy, “Ad Hoc Networks: Technologies and Protocols”,Springer International Edition, 2009

- KazemSohraby, Daniel Minoli, TaiebZnati, "Wireless Sensor Networks', A John Wiley & SonsInc. Publication, 2007
- C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008.

IMCA905 E 2 - MULTIMEDIA SYSTEMS

MODULE I

Introduction, Characteristics, Hardware and Software Requirements, Applications of Multimedia. **Media and data Streams**-Medium, Properties of Multimedia System, Traditional Data Streams,Continuous Data Stream.

MODULE 2

Text-Types, Font, Compression,File Formats. **Sound** - Basic Concepts, Representation, AudioFormats.Music: MIDI,MIDI Devices, MIDI Software Speech:Generation,Analysis, Transmission. **Animation**: Introduction, Key frames,Tweening,File Formats, Types. **Video:** Concepts and Formats

MODULE 3

Image & Graphics: Concepts, Image processing. **Data Compression:** Compression Algorithms **:** Need for compression, Lossless compression algorithms: Run-Length Encoding, Pattern Substitution, Entropy Encoding; Huffman Coding; Arithmetic Coding; Simple Arithmetic Coding, Lossy compression algorithms – DCT, Wavelet –based coding , JPEG – Image preparation, MPEG – Video/ Audio Encoding, MPEG -2, MPEG -4, DVI

MODULE 4

Multimedia DBMS : Characteristics , Data Structure, Operations, Database Model, SGML, ODA,MHEG. **Synchronization** – Notion of synchronization, presentation requirements, Synchronization case studies –MHEG, HyTime, MODE, ACME

MODULE 5

Multimedia Application Development: Design, Development and evaluation of multimedia asystem - The development of user interface design. Multimedia & the Internet, Multimedia conferencing and file sharing, Multimedia broadcasting, Multimedia Development Issues, Multimedia project - Structured Multimedia development, Multimedia project timing

REFERENCES:

- Steinmetz &Nahrstedt, "Multimedia : Computing, Communications and Applications" , PearsonEducation
- Ranjan Parekh, " Principles of Multimedia" , Tata Mc-GrawHill 2006

- Mohammad Dastbaz, Designing Interactive Multimedia Systems
- Multimedia – Technology and applications David Hillman Galgotia Publications, Delhi
- TayVaugham, " Multimedia : Making it work", 7th Edition Tata McgrawHill 2007
- John F. KoegelBufend , "Multimedia systems", Pearson Education, Delhi, 2002
- Ralf Steinmetz and KlaraNahrstedt "Multimedia Applications", Springer, 2007.

IMCA905 E 3 -INFORMATION SECURITY AND E-COMMERCE

MODULE I

The History of Information Security ,Importance of Security,CNSS Security Model , Components of an Information System ,The Systems Development Life Cycle ,The Security Systems Development Life Cycle,The Need for Security-Business Needs ,Threats, Attacks, Secure Software Development.

MODULE II

Risk Management ,Planning for Security, Security Technology Firewalls, VPNs ,Intrusion detection, Access Control and other security Tools.

MODULE III

Overview of E- Commerce framework – E- Business models – Network infrastructure - Role of Internet – E- commerce and World Wide Web, Consumer oriented E- Commerce applications – Mercantile process models -Electronic Payment Systems –Digital Token based EPS – Smart cards – Credit cards – Risks – designing EPS.

MODULE IV

Electronic Data Interchange: EDI applications in Business – EDI and e Commerce – EDI standardization and implementation – Internet based EDI

MODULE V

Internet security standards – secure electronic payment protocols ; cryptography and authentication – security issues – encryption techniques; e commerce payment mechanisms –SET protocol – electronic check – E-commerce ethics, regulations and social responsibility.

REFERENCES:

1. Principles and Practices of Information Security,Michael E. Whitman, Herbert J. Mattord,
2. Ravi Kalakota, Andrew, "Frontiers of Electronic Commerce", Addision Wesley

3. Greenstein and Feinman, “E-Commerce”, TMH

4. Electronic Commerce, By M. Green Stein, Todd M. Feinman. Tata McGraw Hill Pub. 2001.

5. Information Systems Security, Godbole, Wiley-India

6. Information Security Principles and Practice, Deven Shah, Wiley-India

7. Marilyn Greenstein and Todd M Feinman, “Electronic Commerce: Security, Risk Management andControl” Tata McGraw-Hill, 2000

8. Stallings, W., Cryptography and Network Security. Principles and Practice, 4th edition, Prentice Hall.

IMCA 905 E 4 - DIGITAL IMAGE PROCESSING

MODULE I

Digital Image Processing: Origins of Digital Image Processing, Steps in Digital Image Processing, Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships between Pixels, Mathematical Tools used in Digital Image Processing.

MODULE II

Image Transformation & Filters: Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filter, Sharpening Spatial Filters, Combining

Spatial Enhancement methods, Fuzzy techniques for Intensity Transformation and Spatial Filtering. Filtering in the Frequency Domain: Preliminary Concepts, Sampling and the Fourier Transforms of Sampled Functions, The Discrete Fourier Transform (DFT), Properties of the 2-D DFT, Filtering in the Frequency Domain, Image Smoothing and Sharpening using Frequency Domain Filters, Selective Filtering.

MODULE III

Image Restoration, Reconstruction and Image Segmentation: Image Degradation/Restoration process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Functions, Inverse Filtering, Wiener Square Error Filtering, Constrained Least Square Filtering, Geometric Mean Filter, Image Reconstruction from Projections. Image Segmentation: Point, Line and Edge Detection, Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds, Use of Motion in Segmentation.

MODULE IV

Color Image Processing: Color Fundamentals, Color Models, Pseudocolor Image Processing, Full Color Image Processing, Color Transformation, Smoothing and Sharpening, Image Segmentation Based on Color, Noise in Color Images. Wavelets and Multiresolution Processing: Multiresolution Expansion,

Wavelet Transforms in One Dimension, The Fast Wavelet Transforms, Wavelet Transforms in Two Dimensions, Wavelet Packets. Image Compression: Fundamentals, Basic Compression Methods, Digital Image Watermarking.

MODULEV

Morphological Image Processing: Erosion and Dilation, Opening and Closing, The Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology. Object Recognition: Patterns and Pattern Classes, Recognition Based on Decision-Theoretic Methods, Structural Methods.

REFERENCES:

- Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", 3rd Edition, Pearson Education,2008.
- Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing using MATLAB",2nd Edition,
- Prentice Hall of India, 2002.
- A.Jain,"Fundamentals of Digital Image Processing", Prentice Hall of India.

IMCA 905E 5 - DISTRIBUTED COMPUTING

UNIT I

Introduction to distributed systems –definition, goals, types. Architectures- System architectures, architectures versus middle ware. Processes – Threads, Virtualisation. Client-Networked User Interfaces, Client-Side Software for Distribution Transparency. Server-design issues, Distributed Servers, Code Migration-Reasons for Migrating Code

UNIT II

Communication – RPC, Message oriented Communication-Transient communication, Persistent Communication-Message queuing model, Architecture of queuing system, Message Brokers, Stream oriented Communication

UNIT III

Synchronization – Clock synchronization, Logical Clocks, Mutual Exclusion, Election Algorithms-Bully Algorithm, Ring Algorithm Consistency and replication – Data centric consistency, client centric consistency, consistency protocols.

UNIT IV

Fault Tolerance – introduction, process resilience, reliable client-server communication, reliable group communication- Basic Reliable-Multicasting Schemes, Atomic Multicast, distributed commit.

UNIT V

Security – Threats, cryptography, Secure Group Communication, access control mechanisms, security management-Key Management, Secure Group Management Distributed File Systems – Network File System, CODA, XFS

REFERENCES:

- Distributed Systems – Principles and Paradigm, Tanenbaum& Van Steen, 2nd Edition, PHI Publications
- Elements of Distributed Computing, Garg, Wiley Publications
- Distributed Operating System, Pradeep K Sinha, PHI Publications
- M.L. Liu "Distributed Computing Principles and Applications" First Edition
- Robert J. Thierauf "Distributed Processing Systems" 1978, Prentice Hall.
- George Coulouris,"Distribute System: Design and Concepts", 5th Edition Pearson Education.

IMCA905 E6 - COMPUTER GRAPHICS WITH OPEN GL

MODULE I

Introduction: Applications of Computer graphics - Input devices-Display Devices-Graphic software–Output Primitives-Points and Lines- Line drawing Algorithms- Circle generating Algorithms-Introduction to Open GL-Why OpenGL-OpenGL Drawing Primitives.

MODULE II

Transformations: Basic 2D transformations - Reflection, Shear, Composite Transformations.Viewing Pipeline-Window to view port transformation-changing coordinate systems- Clipping-Line clipping Algorithms-Polygon Clipping Algorithms.

MODULE III

Projection: 3D Geometric transformations- Translation, Scaling, Rotation. Perspective parallelMatrix representation – 3D viewing pipeline – 3D clipping

MODULE IV

Representations of 3D Objects : Representation of curves and surfaces–Polygon surfaces-, Quadricsurfaces- Super quadrics- Blobby Objects -Bezier, B-Splines, NURBS. Representing surfaces using polygon meshes- Sweep representations, Boundary representations, Spatial-partitioning representations, Octrees, BSP trees, Constructive solid geometry- Ray casting.

MODULE V

Visible surface detection methods- Basic Illumination Models –Polygon Rendering Methods-Constant, Gouraud, Phong. Comparison of different shading methods-Ray tracing.

REFERENCES

- HearnD., BakerM.P., Computer Graphics usingOpenGL),Prentice-HallofIndia2006.
- FoleyJ.D.,Andries Van Dam, Computer Graphics-Principles and Practice, Addison-Wesley.
- Angel,Edward.InteractiveComputerGraphics-ATop-downApproachwithOpenGL,Addison-Wesley,1996.
- ComputerGraphicsusingOpenGLFS Hill-PrenticeHall
- Geometric tools for Computer Graphics-Philip J.Schneider and David H.Eberly –The Morgan Kaufman series in Computer Graphics & Modeling.

IMCA 906 ADVANCED JAVA PROGRAMMING PRACTICALS

Students are directed to develop programs on demonstrating the theoretical concepts on Advanced Java. A minimum of 20 programs is required in this practical course.

Some tentative programs that can be experimented are as follows:

1. Development of dynamic website of an online Departmental Store. The website should be user friendly and should have the following pages: • Home page • Registration and user login • User profile page • Items catalog • Shopping cart • Payment by credit card • Order confirmation

2. Add validations to the above site for registration, user login, user profile and payment by credit card using Java Script.

3. Creation of a JavaBean which gives the converted value of Temperature (in degree celcius) into equivalent Fahrenheit

4. Creation of a simple Bean with a label – which is a "count" of number of clicks. Then create a BeanInfo class such that only the "count" is visible in the Property Window.

5. Creation of two Beans a) Keypad b) Display pad. After that integrate the two beans to make it work as a calculator.

6. Do the assignment 2 using JSP by converting the static web pages of assignment 2 into dynamic web pages. Create database with User Information and Item information. The Item catalog should be dynamically loaded from the database.

7. Implementation of currency converter program using JSP Struts Framework.

IMCA 907 PYTHON Programming Practicals

MODULE I

Introduction: The Process of Computational Problem Solving, Python Programming Language, Python Data Types: Numbers, Expressions, Variables and Assignments, Strings, List, Python Standard Library, Imperative Programming: Python programs, Execution Control Structures, User-Defined Functions, Python Variables and Assignments, Parameter Passing.

MODULE II

Text Files: Strings, Formatted Output, Files, Errors and Exception Handling, Execution and Control Structures: if Statement, for Loop, Two Dimensional Lists, while Loop, More Loop Patterns, Additional Iteration Control Statements, Containers and Randomness:Dictionaries ,Other Built-in Container Types, Character Encoding and Strings, Module random, Set Data Type.

MODULE III

Object Oriented Programming: Fundamental Concepts, Defining a New Python Class, User-Defined Classes, Designing New Container Classes, Overloaded Operators, Inheritance, User-Defined Exceptions, Namespaces: Encapsulation in Functions, Global versus Local Namespaces, Exception Control Flow, Modules and Namespaces.

MODULE IV

Objects and Their Use: Software Objects,Modular Design: Modules, Top-Down Design, Python Modules, Recursion: Introduction to Recursion, Examples of Recursion, Run Time Analysis, Searching, Iteration Vs Recursion, Recursive Problem Solving.

MODULE V

Graphical User Interfaces: Basics of tkinter GUI Development, Event-Based tkinter Widgets, Designing GUIs, OOP for GUI, The Web and Search: The World Wide Web, Python WWW API, Database Programming in Python.

Reference

1. LjubomirPerkovic, "Introduction to Computing Using Python: An Application Development Focus", Wiley, 2012.
2. Charles Dierbach, "Introduction to Computer Science Using Python: A Computational Problem-Solving Focus", Wiley, 2013.
3. Allen B Downey, "Think Python" ,Oreilly, 2012
4. Dr.Varghese Paul, Dr.Anjana S.Chandran,"Introduction To Computing And Problem Solving Using Python",Educational Publishers And Distributors, 2016

IMCA908 MAIN SEMINAR

Regulation

The Main Seminar is intended to make MCA students aware of the Current / Future trends related to Information Technology/Computer Science/Computer Application.
As such, a seminar report of not less than 15 pages is to be prepared and submitted for final evaluation.

The Main Seminar is **evaluated internally** by the College and carries a total **Marks of 50** divided as follows:

1. Marks for relevance of topic and literature study (20)
2. Marks for Presentation – 2 presentations (20)
3. Marks for Seminar Report (10).

The seminar report should be prepared as per the following guidelines:

1. No of pages : Not less than 15
2. Size A4, One sided
3. Text Size 12 ; Title Size 14 Underlined; Line spacing : 1.5 Full Justified
4. Spiral Binding with uniformity in bind cover.

Every student is expected to present a minimum of 2presentation oftheseminar before the evaluation committee and for each presentation marks can be equally apportioned. A three member committee consisting of qualified **TEACHERS With PG in Computer Science / Computer Application** from the **MCA Department** has to be appointed byHoD. The Committee duly appointed will evaluate the seminar.

At the end of the semester the total marks have to be calculated and send to the University.

A Student shall have to score 50 % for getting a pass in the Seminar .

Semester X

IMCA X01- MAIN PROJECT

Guidelines for Project Work- June 2016 Admn. onwards

The Master of Computer Applications (MCA) programme prepares the students to take up positions as Systems Analysts, Systems Designers, Software Engineers, Programmers and Project Managers in any field related to information technology. As part of the curriculum, all students who are into their sixth semester will have to carryout a project preferably in a software industry or any research organization for duration of one full semester. The courses studied and the mini project & the main project handled at final year will give the comprehensive background to work on diverse application domains.

The objective of the MCA project work is to develop quality software solution. During the development of the project, the student should involve in all the stages of the software development life cycle like requirements engineering, systems analysis, systems design, software development, testing strategies and documentation with an overall emphasis on the development of reliable software systems. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, so as to participate and manage a large software engineering projects in future. Students should take this project work **very seriously**, and carry out the same individually. The topics selected should be complex and large enough to justify as an MCA project. The project should be genuine and original in nature and should not be copied from anywhere else.

After the completion of this project work, the student should be able to:

vii) Describe the Systems Development Life Cycle (SDLC).
viii) Evaluate systems requirements.
ix) Complete a problem definition and its evaluations.
x) Construct and evaluate UML's/Data flow diagrams and Data Dictionaries
xi) Evaluate alternative tools for the analysis process.
xii) Create and evaluate such alternative graphical tools as systems flow charts and state transition diagrams.
xiii) Plan the systems design phase of the SDLC.
xiv) Distinguish between logical and physical design requirements.
xv) Design and evaluate system Inputs & outputs and UI.

xvi) Decide various data structures.
xvii) Perform coding for the project.
xviii) Documentation requirements and prepare and evaluate systems documentation.
xix) Generate various reports.
xx) To decide the future scope and further enhancement of the system.

- Develop of the ability to assess the implications of work performed.
- Get good exposure and command in one or more application areas and on the software
- Develop of the ability to communicate effectively.

All students are expected to work on a real-life project preferably in some Industry / Research and Development Laboratories / IT-ITES Organisations. The complete project work should be done by the student only. The role of guide should be about guidance wherever any problem encounters during project.

i) **Not more than one student is permitted to work on a project**.

ii) Each Student should be involved in each and every phase of Project Development. If it is found that student is not involved in any phase; for example coding phase, it may lead to the rejection/disqualifying of the project at any stage.

iii) Title of the project should be kept the same throughout the project.

Guidelines for preparing the Project Dissertation

This document lists the contents required for the academic project report done as part of the MCA Curriculum. Section names have been listed with description. The descriptions have been provided in italics. *Important: This page and the text in italics present throughout this document are to give you guidance. Please do not include them in your project report.*

CONTENTS OF THE ACADEMIC PROJECT REPORT

1. **Cover Page as per format**

Use the same format given in the project doc

2. **Certificate of the Company/Organization**

Use the same format given in the project doc

3. **Certificate of the Head Of Department as per format**

Use the same format given in the project doc

4. **Certificate of the Internal project guide as per format**

Use the same format given in the project doc

5. **Declaration**

By student – format given

6. **Acknowledgement**

Use the same format given in the project doc

7. **Revision history**

Table with version, date, author, changes done, approval

8. Table of Contents

Please use the MS Word Table of content feature for this and not a manual TOC.

9. Executive Summary

This should describe the problem and the solution given by your project in brief. You should also mention the process model you used for development, methodology and technology. Limit the description to 1-2 pages.

10. Background

UP Phase: Inception

10.1. Existing System

Describe the system that already exists. Please note that the system could be manual or automated or a combination of both. Provide the business flow using an activity diagram.

10.2. Definition of Problem-

Describe the problems/inadequacies of current set up.

10.3 Proposed System

Explain how the proposed system will solve the problems.

Provide the revised business flow involving your system using an activity diagram, if relevant.

11. Project Overview

UP Phase: Inception

11.1. Objective of the Project

Describe the business benefits expected from this project.

11.2. Stakeholders

List the stakeholders, their goals which will be satisfied by this system and the benefits.

11.3. Scope of the Project

Mention in brief the system proposed to meet the objective. Mention clearly if any part of the work is not in your scope – e.g. installation, or some data migration required for implementation of this system, integration with some other system etc.

11.4 Feasibility Analysis

11.4.1. Technical feasibility

Technology and system feasibility - The assessment is based on an outline design of system requirements in terms of Input, Processes, Output, Fields, Programs, and Procedures. This can be quantified in terms of volumes of data, trends, frequency of updating, etc. in order to estimate whether the new system will perform adequately or not

11.4.2. Operational feasibility

Is a measure of how well a proposed system solves the problems, and takes advantages of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development

11.4.3. Schedule feasibility

Schedule feasibility is a measure of how reasonable the project timetable is.

11.5.4. Economic feasibility - Cost - Benefit Analysis

If the company had already done the analysis before deciding on the project, then obtain the information from the company and just mention it here. If this analysis was performed by the student, then

explanation of how the analysis was conducted should be provided. The analysis aims to determine the benefits and savings that are expected from a candidate system and compare them with costs.

12. Overall Project Planning

UP Phase: Inception

12.1. Development environment

Identify and list the technology and tools planned to be used in the development of the project – IDEs, compilers, UML tool, configuration management tool etc.

12.2. Constraints

List the constraints applicable to your project e.g. time constraints, budget constraints, resource constraints, any other constraints set by the customer.

12.3. Deliverables

List all deliverables expected by the customer – e.g. application, configuration files, source code, any 3rd party software packaged along with this, documents – requirements, design, user manual, installation manual, tutorial – as applicable for your project.

12.4. Assumptions and dependencies

List the assumptions and dependencies made while planning the project, eg .there could be an assumption that the required inputs will be given by users or that users will be available to review the documents or that the testing team will be available to test if required etc.

12.5. Risks

List any risks you foresee in the execution of this project and describe the plan to mitigate it.

12.6. Process model

Mention which process model you chose to develop this project and the justification for it.

12.7. Test Strategy

Mention all testing strategies – unit, integration, system, user acceptance testing that have been used.

12.8. Testing environment and tools

The environment for testing should give the specifications of hardware and software used for testing. Tools used for testing if any, should be listed here.

13. Iteration Planning

UP Phase – Each iteration in each phase

13.1. Schedule

Put the schedule here – activities, dependencies, start and end dates.

13.2. Risks

List any risks you foresee in the execution of this iteration and describe the plan to mitigate it.

14. High level system Analysis

UP Phases: Inception

This analysis will be performed completely during inception and will be continued to be revised in the elaboration stage.

14.1. User characteristics

Mention the different types of users or user groups of the proposed system and any special training needs they have in order to use this system.

14.2. Summary of system features/Functional requirements

List the features identified to be part of this system in order to satisfy this goal.

14.3. Non Functional Requirements / Supplementary Specification

List the non functional requirements applicable to your project related to performance, security etc.

14.4. Glossary

Define the business/domain terms specific to the context of this system

14.5. Business Rules

Define the business rules specific to the user's domain/organization that need to be satisfied by this system.

14.6. Use cases

List all the use case names here and a brief description of each use case.

14.7. Use case diagram

15. Domain Model

UP Phases: Inception and Elaboration

The initial model will be identified during elaboration and will be continued to be revised in the elaboration stage. Give the analysis level class diagram, i.e. the domain model here and a brief description of the analysis level classes.

16. Use Case Model

Relevant UP Phases: Inception and Elaboration

To be developed during inception for a critical few use cases and the remaining use cases (majority) will be developed during elaboration for the majority of the use cases.

16.1. Use case text

Write the detailed use case text, in the fully dressed format for each use case. Identify the non functional requirements and rules to be followed specific to the use case being considered. Also identify the user inputs in the form of text and file inputs to system (if any). Develop the format of input which the system will accept, with examples. If it is a file input, format of file and format of data within it (if relevant) have to be provided.

Develop error messages and information texts required as part of this use case. Any external system interface requirements also need to be identified

16.2. System sequence diagram

For each use case under consideration, draw the system sequence diagram(s).

16.3. Operation contracts

For each system sequence diagram under consideration, write up the operation contracts.

16.4. Reports

Develop the format of the reports generated as part of this use case, if any.

Design Model

UP Phases: Elaboration and Construction

Developed completely in elaboration and revised in construction phase.

16.5. Sequence diagrams

Develop the design level sequence diagrams for the use case under consideration.

16.6. Class diagrams

Develop the design level class diagram for the use case under consideration.

16.7. UI design

Develop the screens identified for the use case under consideration and provide snapshots. At this stage, static screens are sufficient.

16.8. Theoretical Background

Theoretical details about the technology, tools and algorithms you have used in this project should be mentioned here in brief.

16.9. Architecture

In this section, show pictorially the logical and deployment architecture of this system. Use package diagrams, component and deployment diagrams for this.

16.10. Database design

This should give a catalogue of the data elements used in the system / sub system developed. The following are the details require for each table and field in the table. Repeat this list as many times there are tables and fields. Write NA if NOT applicable:

16.10.1. Table Name
- 16.10.1.1. Field Name
- 16.10.1.2. Length
- 11.4.1.1 Type CHAR, VARCHAR, NUMBER, DATE etc.
- 11.4.1.2 Description

17. Testing

UP Phases: Construction and Transition

Developed completely in construction and revised in transition phase.

17.1. Test cases

List each test case – with description, inputs, expected output, pass/fail criteria.

17.2. Test Report

Actual result against the expected results of test cases should be compiled here. A measure of quality like % of passed test cases should also be provided.

17.3. Sample Code used for testing

Sample code used for unit testing should be provided.

18. Transition

Relevant UP Phase: Transition

18.1. System Implementation

Describe the implementation mechanisms. Describe the method of data conversion and migration for the new system if applicable.

18.2. System Maintenance

Describe the plan for maintenance of the system. Mention the documents and any training provided by the student for future maintenance.

18.3. User/Operational Manual

If there was a user manual expected as deliverable by the customer, provide it here. If there was a demo or training given to users on the system, mention that. If there are any limitations of the system or constraints on inputs like data format, which have to be taken care by users, list it here. Also mention the details required for operation of the system. This should include instructions on how to start and shutdown the system, description of expected folder structure of system related files after installation, list of roles of users required to be created and maintained in the system.

If there are any requirements to do periodic cleaning of data, those have to be mentioned here. If the delivery of scripts or programs for automatic data cleaning is in scope, usage of the scripts should be

described. Configuration management related information, if applicable, should be provided to suggest frequency of backups of files.

19. Annexure :

19.1. Organization profile

Give a brief background of the organization where the student has developed the project

19.2. Document Glossary, Figures, Tables

List of abbreviations should be provided in the document glossary. Each figure and table should be labeled. You should create an index for these like the table of contents.

19.3. References :

Books: *Any references you made to books and papers should be listed here with the book name, edition, name of author and publisher.*

Websites: *Any references you made to websites should be listed here with the URL and date of access.*

19.4. User Interview Questionnaires

19.5. Sample Project code / Algorithm if project code is not available.

The format of various certificates to be included in the Project report is appended along with this guidelines.

Format of certificates to be attached in the project report

A Project Report

On

"PROJECT TITLE"

Submitted to the

Department of MCA

In partial fulfillment of the

MASTER OF COMPUTER APPLICATIONS

Under the guidance of

Internal Guide's Name

Project Done by

NAME OF STUDENT

(Reg No:)

EMBLEM OF COLLEGE

DEPARTMENT OF MCA

NAME AND ADDRESS OF COLLEGE

Month-Year

NAME AND ADDRESS OF COLLEGE

EMBLEM OF COLLEGE

BONAFIDE CERTIFICATE

Certified that the Project Work entitled

"PROJECT TITLE"

is a bonafide work done by

Name of the student

In partial fulfillment of the requirement for the Award of

MASTER OF COMPUTER APPLICATIONS

Degree From

Mahatma Gandhi University, Kottayam

(Period of study)

Head of Department *Project Guide*

Submitted for the Viva-Voce Examination held on……

External Examiner1 **External Examiner2**

(Name & Signature) (Name & Signature)

NAME AND ADDRESS OF COLLEGE

EMBLEM OF COLLEGE

CERTIFICATE

This is to certify that the project entitled **"PROJECT TITLE"** has been successfully carried out by ***NAME OF STUDENT*** (Reg. No:) in partial fulfilment of the Course **Master of Computer Applications.**

INTERNAL GUIDE

Date: **HEAD OF THE DEPARTMENT**

NAME AND ADDRESS OF COLLEGE
EMBLEM OF COLLEGE

CERTIFICATE

This is to certify that the project entitled **"PROJECT TITLE"** has been successfully carried out by **NAME OF STUDENT** (Reg no:) in partial fulfilment of the course **Master of Computer Applications** under my guidance .

Date: Name of Guide

INTERNAL GUIDE

NAME AND ADDRESS OF COLLEGE
EMBLEM OF COLLEGE

DECLARATION

I, **NAME OF STUDENT**, hereby declare that the project work entitled **"NAME OF THE PROJECT"** is an authenticated work carried out by me at ***XYZ SOFTWARE PVT. LTD.*** under the guidance of **Guide's Name** for the partial fulfilment of the course **MASTER OF COMPUTER APPLICATIONS**. This work has not been submitted for similar purpose anywhere else except to **NAME OF COLLEGE.**

I understand that detection of any such copying is liable to be punished in any way the school deems fit.

NAME OF STUDENT

Date:

Place:

Signature

IMCA X02 – VIVA VOCE

The Viva-Voce Examination of X^{th} Semester is a comprehensive evaluation of what has been learned through the entire MCA programme.

Students will be evaluated through all core subjects of the MCA programme and marks will be awarded on the basis of oral answers given by the student.

There is no internal mark component for the same. The maximum marks for the Viva Voce examination is 100. The evaluation is done by the evaluators duly appointed by the University.