

MATS UNIVERSITY
MASTER OF COMPUTER APPLICATION (MCA) DUAL DEGREE
REGULATIONS

Introduction to the course –

India has proved its natural expertise in software development and related expertise after emergency as largest BPO organizations to cater top IT industries worldwide. Now this natural quality of Indians to outperform in logic development has made them as a natural choice for HR recruitment in any big IT organization. This process is not only creating jobs for Indians worldwide but also enhancing the foreign reserve level of our nation.

With this situation in mind country needs excellent education facilities to generate a HR of high quality to cater IT needs worldwide.

Program Objective

- To prepare graduates who will be successful in industry, government, academia, research, entrepreneurial pursuit and consulting firm
- Student will develop software solutions to problems across a broad range of application domain.
- Graduates will be able to communicate technical information effectively, both orally and in writing
- Graduates will be able to work collaboratively as a member or leader in multidisciplinary teams.

Program Outcome

- Student will get ability to identify, critically analyse, formulate and develop computer application
- Student will be able to select modern computing tool and techniques and use them with dexterity
- Student will get skill to analyse a problem and identify and define the logical modelling of solution
- Students will be able to use the techniques, skills and modern hardware and software tools necessary for innovative software solutions.
- Student get ability to devise and conduct experiments, interpret data and provide well informed conclusions

1. Scope and Content:

- 1.1 The Regulation documented here are applicable for the Master of Computer Applications programme offered by the University.
- 1.2 The applicability of the Regulation must be understood in the context of the given Scheme of study and Syllabus of the programme.
- 1.3 The authorities of University may modify, add, delete expand or substantiate any part of the Regulations and syllabi, at any time.

2. Course Content:

The programme, shall be for a duration of six semesters, spread out in three years. Each semester of the programme shall consist of either all or some of the following components:

- 2.1 Core Subjects
- 2.2 AECC (Ability Enhancement Compulsory Course)
- 2.3 SEC(Skill Enhancement Course)
- 2.4 DSE (Discipline Specific Electives) /Choice Based
- 2.5 GE(Generic Electives)
- 2.6 Lab Course
- 2.7 Project Work
- 2.8 **Specializations**

2.1 Core Subjects

Core subjects comprises of subjects that form an integral part of the programme. These subjects provide a strong ground in basic disciplines of study.

2.2 AECC (Ability Enhancement Compulsory Course)

The students who have not done English up to class XII are to opt for Hindi Communication. They can opt Environment studies and other languages also .

2.3 SEC(Skill Enhancement Course)

This will facilitate student mobility across institutions within and across countries and also enable potential employers to assess the performance of students.

2.4 DSE (Discipline Specific Electives) /Choice Based

Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study)

2.5 GE(Generic Electives)

An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective. P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

2.6 Lab Courses

These subjects are totally practical-based subjects. The learning of these subjects will be performed in laboratories/practical sites with equipments/resources. These subjects shall support the practical implementation of the core/core-bracket subjects. The processes of evaluation of their subjects will depend on the nature of that individual subject.

2.7 Project Work

The project work shall be done for a duration as specified by the Coordinator, in the area, related to the main subject of study or the specialization. The project work shall give the student an insight to the situations existing in the field/marketed/industries, etc.

2.8 Specializations

MCA students may specialize in any one of the following specializations:

Elective – 1

1. Advanced DBMS
2. Wireless Communication

Elective – 2

1. Advance Data Warehousing and Mining
2. MANET and Wireless Sensor Network
3. Parallel and Distributed Computing
4. Soft Computing

Elective – 3

1. Geo-Informatics
2. Bio-Informatics
3. Nano -Technology, NEMS Technology & Applications
4. Image Processing
5. Neural Network
6. Embedded System
7. Advanced software Engineering

3 Eligibility for admission and mode of selection

3.1 The minimum qualification required to be eligible for admission is a pass in a Graduate Degree examination of this University or any other examination recognized as equivalent thereto of any other recognized University, with Mathematics as one of the subjects of study either at the 10+2 or at the Bachelors' degree level.

3.2 The method of selection for the course shall normally be by means of an entrance test and a personal interview.

4 Attendance Requirement

A student is eligible to appear for the term-end examinations, only if she/he has put in a minimum of 75% attendance in each subject individually.

5 Assessment and Examination

5.1 Credits

Credit Points will be awarded for all the subjects. One credit is equivalent to ten classroom contact hours.

Each core subjects will carry either 4 or 2 credits, each bracket subject will carry 3 credits and practical courses will carry either 4 or 2 credits depending on the number of hours of teaching and training.

5.2 Pattern of Assessment

Assessment of student's performance will be based on two components i.e. Internal Assessment and Term-end Examination conducted at the end of each semester.

A four-credit subject will comprise of an Internal Assessment component of 30 marks and a Term-end Examination components of 70 marks.

A two-credit subject will comprise of an Internal Assessment component of 15 marks and a Term-end Examination components of 35 marks.

Sessional tests, assignments, mid-term examinations etc, will be conducted in each subject during the course of each semester, for the purpose of internal assessment.

The Term-end examinations will be conducted as per the University regulations.

5.3 Assessment for Core Bracket subjects

Depending on the participation and performance of students, the faculty of the Core Bracket subject will grade the student in terms of a four-point scale as given below:

Marks Secured	Grade Point	Letter Grade
80 and above	10	Outstanding(O)
70 and above but below 80	9	Excellent (A+)
65 and above but below 70	8	Very Good (A)
60 and above but below 65	7	Good (B+)
55 and above but below 60	6	Above Average (B)
50 and above but below 55	5	Average (C)
45 and above but below 50	4	Pass(P)
Below 45	0	Fail (F)
	0	Absent (AB)

This assessment is purely based on internal assessment of the subject faculty/coordinator.

5.4 Assessment of Project work

The project work will carry a total of 600 marks. Of this, 70% marks are for the external examination and 30% marks will be awarded for internal evaluation.

Evaluation of Industrial Project and Seminar:

- During the 6th Semester, the students shall present on the scheduled dates, their progress, twice to the Department committee based on which the Project sessional marks are awarded.
- The project Seminar marks are awarded based on the project presentation and decomposition at the end of the semester by the Department committee.
- Project final evaluation in the Term – end Exams, is based on project report and viva-voce.

5.5 Eligibility to appear for the Term-end Exam.

Students, who have put in minimum of 75% attendances in each subject, shall be eligible to appear for the Term-end examination.

6 Eligibility for Pass

- A student shall be declared to have passed in a subject, if he/she secures at least 50% marks in the term-end examination, including internal assessment.
- When a student reappears for the failed subject(s), the internal assessment marks originally secured by him/her in the first appearance in the subject(s), if any, will be carried forward.
- A student shall be declared to have passed in a Core Bracket subject, if he/she secures at least a pass grade.
- Promotion of the student to the next semester, is not automatic, but is dependent on certain other conditions.

7 Classification of successful students

7.1 On successful completion of the programme, the students will be classified as below:

Distinction :Those securing aggregate marks of 75% and above in all the subjects;

First Class :Those securing aggregate marks of less than 75% but above 60% above in all the subjects; and

Second Class:Those securing aggregate marks of less than 60% but above 50% above in all the subjects;

7.2 Ranks Only students, who have passed each of the semester examination at the first appearance, shall be eligible for award of Ranks. The First three ranks shall be notified.

8 Award of Qualification

Students will be awarded the MCA degree upon Fulfilment of the following criteria –

- a. must have passed all the subjects of the six semesters with minimum of 45% in each subject including Internal assessment.
- b. must have secured at least a pass grade in all the Core Bracket subjects.
- c. must have secured a minimum of 45% marks in the project work (wherever applicable).
- d. must have complied with all other assessment guidelines and criteria notified during the conduct of the programme.

9 Maximum period for completion of the programme

The maximum period for the completion of the programme shall be five years from the date of joining the programme.

10 General Guidelines

10.1 Academic Integrity and Ethics

- a. A student who has committed an act of academic dishonesty will be deemed to have failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basis for disciplinary action but also is relevant to the evaluation of student's level of performance and progress.
- b. Where there has been violation of the basic ethos and principles of academic integrity and ethics, the Director/ Board of Examiners/ Course coordinators may use their discretion in terms of disciplinary action to be taken.
- c. Academic dishonesty includes, but is not necessarily limited, to the following –
- d. Cheating or knowingly assisting another student in committing an act of cheating;
- e. Unauthorized possession of Examination materials, destruction or hiding of relevant materials;
- f. Act of plagiarism;
- g. Unauthorized changing of marks or making on examination records.

10.2 Attendance

- a. Students are required to attend and participate in all scheduled class sessions, guest lectures, workshops, outbound learning programs and club/ forum activities of both academic and non academic nature.
- b. Students may be dropped from the programs due to excessive and non-intimated absences.
- c. Students must notify the program coordinator in writing, the reasons for absence, if any, from class sessions, activities and assessment components.
- d. On notification of absences (including anticipated absences), the Director/ Programme coordinator would determine whether the absences could be rectified or whether it is possible to satisfactory complete the subject with the number of identified absences.

10.3 General

- a. The students are expected to spend a considerable amount of time in research, reading and practice.
- b. All students are expected to develop and maintain a positive professional attitude and approach throughout the professional attitude and approach throughout the programme and in conduct of all other activities.
- c. Attendance alone is not sufficient. Students are expected to participate, to help the class learn and understand the topics under consideration.
- d. Food and drinks are not permitted in the classroom/ conference hall.
- e. All students are expected to dress as per stipulated dress code.

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -I						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
BCA101	PROGRAMMING IN 'C'	4	3+1+0	70	30	100
BCA102	FUNDAMENTALS OF COMPUTER	4	3+1+0	70	30	100
BCA103	QUANTITATIVE METHODS	6	5+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA104	ENVIRONMENTAL STUDIES	2	1+1+0	35	15	50
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
BCA105	OFFICE AUTOMATION CERTIFICATION	6	2+0+4	70	30	100
LAB COURSES						
BCA106	PROGRAMMING IN 'C' LAB	2	0+0+2	35	15	50
BCA107	FUNDAMENTALS OF COMPUTER LAB	2	0+0+2	35	15	50
		26		385	165	550

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -II						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
BCA201	OBJECT ORIENTED PROGRAMMING - C++	4	3+1+0	70	30	100
BCA202	RELATIONAL DATA BASE MANAGEMENT SYSTEM	4	3+1+0	70	30	100
BCA203	SOFTWARE ENGINEERING	6	5+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA204	COMMUNICATIVE ENGLISH	2	1+1+0	35	15	50
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
BCA205	DESKTOP PUBLISHING	6	2+0+4	70	30	100
LAB COURSES						
BCA206	OBJECT ORIENTED PROGRAMMING - C++ LAB	2	0+0+2	35	15	50
BCA207	RELATIONAL DATA BASE MANAGEMENT SYSTEM LAB	2	0+0+2	35	15	50
		26		385	165	550

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -III						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
BCA301	DATA STRUCTURE USING C++	4	3+1+0	70	30	100
BCA302	COMPUTER GRAPHICS	4	3+1+0	70	30	100
BCA303	DISCRETE MATHEMATICS	6	5+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA304	ENTERPRENEURSHIP	2	1+1+0	35	15	50
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
BCA305	COMPUTATIONAL ACCOUNTING STATISTICAL TOOLS	6	2+0+4	70	30	100
LAB COURSES						
BCA306	ALGORITHM AND DATA STRUCTURE USING C++ LAB	2	0+0+2	35	15	50
BCA307	COMPUTER GRAPHICS LAB	2	0+0+2	35	15	50
		26		385	165	550

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -IV						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
BCA401	PROGRAMMING USING VB .NET	4	3+1+0	70	30	100
BCA402	Principal of operating system & Linux concept	4	3+1+0	70	30	100
BCA403	Data Communication and Network	6	5+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA404	MINI PROJECT	2	1+1+0	35	15	50
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
BCA405	CLIENT SERVER ARCHITECTURE IMPLEMENTATION AND NETWORK TROUBLE SHOOTING	6	2+0+4	70	30	100
LAB COURSES						
BCA406	PROGRAMMING USING VB .NET LAB	2	0+0+2	35	15	50
BCA407	OPERATING SYSTEM LAB	2	0+0+2	35	15	50

		26		385	165	550
MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER - V						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
BCA501	PROGRAMMING IN CORE JAVA	4	3+1+0	70	30	100
BCA502	WEB DESIGNING	4	3+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
BCA503	ELECTIVE I	4	3+1+0	70	30	100
BCA504	ELECTIVE II	4	3+1+0	70	30	100
BCA505	INDUSTRIAL/COMPANY/ PROFESSIONAL TRAINING	4	0+0+4	70	30	100
GE(GENERIC ELECTIVES)						
LAB COURSES						
BCA506	CORE PROGRAMMING IN JAVA LAB	2	0+0+2	35	15	50
BCA507	WEB DESIGNING LAB	2	0+0+2	35	15	50
		24		420	180	600

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER - VI						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
BCA601	ADVANCED JAVA PROGRAMMING	4	3+1+0	70	30	100
BCA602	INTRODUCTION TO MICROSOFT .NET FRAMEWORK AND C#	4	3+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
BCA603	ELECTIVE III	4	3+1+0	70	30	100
BCA604	ELECTIVE IV	4	3+1+0	70	30	100
BCA605	SYSTEM DEVELOPMENTPROJECT (SYSTEM DESIGNAND IMPLEMENTATION)	4	0+0+4	70	30	100
GE(GENERIC ELECTIVES)						
LAB COURSES						
BCA606	ADVANCED JAVA PROGRAMMING LAB	2	0+0+2	35	15	50
BCA607	INTRODUCTION TO MICROSOFT .NET FRAMEWORK AND C#	2	0+0+2	35	15	50

	LAB					
		24		420	180	600
MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -VII						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
MCA301	Programming in Core JAVA	4	3+1+0	70	30	100
MCA302	Web Designing and Scripting Language	4	3+1+0	70	30	100
MCA303	Elective I	4	3+1+0	70	30	100
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
MCA304	Operations Research	4	3+1+0	70	30	100
MCA305	Theory of Computation	4	3+1+0	70	30	100
GE(GENERIC ELECTIVES)						
LAB COURSES						
MCA306	Programming in Core JAVA	2	0+0+2	35	15	50
MCA307	Web Designing and Scripting Language	2	0+0+2	35	15	50
		24		420	180	600

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -VIII						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
MCA401	Web Programming and Extensible Markup language	4	3+1+0	70	30	100
MCA402	Image processing	4	3+1+0	70	30	100
MCA403	Elective II	4	3+1+0	70	30	100
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
MCA404	Summer Internship	4	3+1+0	70	30	100
MCA405	Artificial Intelligence	4	3+1+0	70	30	100
GE(GENERIC ELECTIVES)						
LAB COURSES						
MCA406	Web Programming and Extensible Markup language	2	0+0+2	35	15	50
MCA407	Image processing	2	0+0+2	35	15	50
		24		420	180	600

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -IX						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
MCA501	Programming in Advance Java – J2EE	4	3+1+0	70	30	100
MCA502	MS .Net Part II	4	3+1+0	70	30	100
MCA503	Elective III	4	3+1+0	70	30	100
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
MCA504	Industrial/Company/Professional Training	4	3+1+0	70	30	100
MCA505	Research paper publication in the field of specialization	4	3+1+0	70	30	100
GE(GENERIC ELECTIVES)						
LAB COURSES						
MCA506	Programming in Advance Java – J2EE LAB	2	0+0+2	35	15	50
MCA507	MS .Net Part II LAB	2	0+0+2	35	15	50
		24		420	180	600

MASTER OF COMPUTER APPLICATION DUAL DEGREE- MCA						
SEMESTER -X						
Subject Code	Subject	Credit	L+T+P	Univ.	Int. Marks	Total Marks
		1 Cr= 1 hrs		Exam Marks		
CORE COURSES						
MCA601	SYSTEM DEVELOPMENT PROJECT	4	3+1+0	70	30	600
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
LAB COURSES						

BCA101

Programming in 'C'

COURSE OBJECTIVES

This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code. The nature of C language is emphasized in the wide variety of examples and applications. To learn and acquire art of computer programming. To know about some popular programming languages and how to choose Programming language for solving a problem.

COURSE OUTCOME Upon successful completion of this course, students will be able to

- Understand the basic terminology used in computer programming
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers and Structures.
- Use different data structures and create/update basic data files.

MODULE I: Overview of C: History of 'C', Structure of 'C' program. Data types Int, float, char, double, void, Data structures. Constants and Variables: Variable declaration - integer, real, float, character, logical variables, string variables, Constants, Operators and Expressions: Arithmetic operators, Relational operators, Logical operators, Expressions, Control Constructs: If-then, For, While. Arrays: Array declaration, One and Two dimensional arrays. Functions - Fundamentals: General form, Function arguments, returns value. Basic I/O: Formatted I/O, Unformatted I/O. Advanced features: Type modifiers and storage class specifiers for data types, various operators, Type casting, type conversion

MODULE II: Control Constructs: Do-while, Switch statements, Break and continue, Exit () function, Go to and label. Scope rules: Local and Global variables, scope rules of functions. Functions : Parameter passing, call-by-value and call-by-reference, calling functions with arrays, argc and argv, Recursion: Basic concept, design

MODULE III: Pointers: & and * operators, Pointer expression, pointer assignments, pointer arithmetic, pointer comparison, dynamic allocation functions -malloc and calloc, pointers vs. Arrays, Arrays of pointer, pointers to pointers, initializing pointers, pointers to functions, function returning pointers, functions with variable number of arguments.

MODULE IV: Structures : Basic of structures, declaring a structure, referencing structure elements, arrays of structures, passing structure to functions, passing entire structure to functions, structure pointers declaring a structure pointer, using structure pointers, arrays and structure within structure, uses. Unions: declaration, uses, enumerated data types, typedef,

MODULE V: File handling: file pointer, file accessing functions, fopen, fclose, putc, getc, fprintf, C preprocessor, #define, #include, #undef, #conditional compilation directives, #if, #else, #elif, #endif, #ifdef and #ifndef, C standard library and header files : header files, stdio.h, ctype.h, string.h, math.h, stdlib.h, etc., standard library functions, string functions, mathematical functions, date and time function.

Text Books:

1. Programming in C Yashwant Kenetkar
2. Programming in 'C' Venugopal
3. The C Programming Language Kernigham and Ritche [Prentice Hall]
4. Application Programming in C Richard Johnson-baugh& MartinKalin
5. The Spirit of C Macmillan International Editions, Mullish Cooper, Jaico Publishing House.
6. How to solve it by Computers R.G.Dromey, Prentice Hall of India.
7. Mastering in CPP Venugopal

Reference Books:

1. The art of C Programming Jones, Robin & Stewart, Narosa Publishing House.

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| 2. C Problem solving and Programming | A. Kenneth, Prentice Hall International. |
| 3. C made easy | H.Schildt, McGraw Hill Book Co. |

BCA102

Fundamentals of Computers

Course Objective:

The objective of the course is to introduce the concepts of computer fundamental & their applications for the efficient use of office technology.

Course Outcome:

- Student will be able to identify various important parts of computer device.
- Student will be able To find right kind of storage device.
- Student will get hands on experience for basic application software
- Demonstrate the practices in data & file management.

MODULE I: Computer System Characteristics and Capabilities: Speed, Accuracy, Reliability, Memory capability, Repeatability. Computer Hardware and Software: Block Diagram of a Computer, Different Types of Software's. Data Processing: Data, Data Processing System, Storing Data, Processing Data. Types of Computers: Analog, Digital, Hybrid General and Special Purpose Computers. Computer Generations: Characteristics of Computer Generations Computer Systems – Micros, Minis & Main-frames. Introduction to a PC: The IBM Personal Computer Types of PC systems PC, XT & AT Pentium PC's Limitations of Micro Computer.

MODULE II: Introduction to Input Devices: Categorizing Input Hardware, Keyboard, Direct Entry – Card Readers, Scanning Devices – O.M.R., Character Readers, MICR, Smart Cards, Voice Input Devices, Pointing Devices – Mouse, Light Pen.). Computer Output :Output Fundamentals, Hardcopy Output Devices, Impact Printers, Non-Impact Printers, Plotters, Computer output Microfilm/Microfiche(COM) systems, Softcopy Output Devices, Cathode Ray Tube, Flat Screen Technologies.

MODULE III: Storage Devices :Storage Fundamentals, Primary and Secondary Storage, Data Storage and Retrieval Methods – Sequential, Direct & Indexed Sequential, Tape Storage and Retrieval Methods Tape storage Devices, characteristics and limitations, Direct access Storage and Microcomputers - Hard Disks, Disk Cartridges, Direct Access Storage Devices for large Computer systems, Mass storage systems and Optical Disks, CD ROM. Central Processing Unit : The Microprocessor, control unit, A.L.U., Registers, Buses, Main Memory, Main Memory (RAM) for microcomputers, Read Only Memory(ROM)

MODULE IV: System Software :System software Vs. Application Software, Types of System Software, Introduction and Types of Operating Systems programs, Booting Loader, Diagnostic Tests, Operating Systems Executive, BIOS, Utility Programs, File Maintenance, Language Processors, Assembler, Compiler & Interpreter. Application Software: Microcomputer Software, Interacting with the System, Trends in PC software, Types of Application Software, Difference between Program and Packages.

MODULE V: Introduction, History and Version of DOS, Fundamentals of DOS: Physical Structure of the Disk, Compatibility of drives, Disks & DOS versions, Preparing Disks for use, Device Names. Getting Started with DOS : Booting Process, System Files and Command.com, Internal DOS Commands - DIR, MD, CD, COPY, DEL, REN, VOL, DATE, TIME, CLS, PATH, TYPE. Files & Directories, Elementary External DOS Commands - CHKDSK, MEM, XCOPY, PRINT, DISKCOPY, DISKCOMP, DOSKEY, HELP, TREE, SYS, LABEL, ATTRIB, Creating a Batch Files, Additional Commands - ECHO, PROMPT, MODE, GRAPHICS, EDIT, FORMAT, FDISK, BACKUP, RESTORE, MORE, SORT, APPEND.

Text Books:

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| 1. Using IT | - Williams- T M Hill |
| 2. Fundamental of computers | - ChetanSrivastav |
| 3. 'O' level | - V. K. jain |
| 4. Fundamentals of Computers | - V. Rajaraman Prentice-Hall India |

BCA103
Quantitative Methods

Course objective

Mathematics concepts and notation are useful in studying and describing objects and problems in computing algorithms and programming language in different computer domain application.

Course Outcome:

- Data handling in matrix and evaluation.
- Student will understand derivative method
- Student learn basic statistical concept.

MODULE I: Averages, Percentage, Ratio, Proportion, Permutation and Combinations, Definition of Matrix, Types of Matrices, Addition and Subtraction of Matrices, Scalar Multiplication and Matrix Multiplication, Determinants, Calculation of Value of Determinants Up to Third Order, Adjoint of A Matrix, Finding Inverse Through Adjoint of a Matrix, Solution of a System of Linear Equations Using Matrix & Determinates Methods (Up To Three Variables.)

MODULE II: Calculus: Functions Definition and Types, Derivatives of Some Standard Functions, Differentiation of Functions of Function, Product of Functions, Function in Quotient Form, Logarithmic Differentiation, Higher Order Derivatives and Their Uses, Maxima and Minima. Integration: Definition, Integration of Some Standard Functions, Substitution in integration, Definite Integral.

MODULE III: Introduction to Statistics, Frequency Distribution, Measures of Central Tendency, Arithmetic Mean, Median, Mode, Quartiles, Deciles, Percentiles. Measure of Dispersions: Range, Mean Deviation, Interquartile Range, Standard Deviation, Coefficient of Variations.

MODULE IV: Measures of Relation: Meaning, Definition and Use of Correlation- Types of Correlation: Karl Pearson's Correlation Coefficient, Spearman's Rank Correlation, Regression Analysis, Regression Equations - Interpretation of Regression Coefficients

MODULE V: Probability–Basic Concepts of Probability, Multiplication and Addition Theorem of Probability, Conditional Probability, Bayes Theorem, discrete Random Variables, Expected Value & Variance of Random Variables.

Text Books:

- | | | |
|---------------------------------------|---|--------------------------|
| 1. Business Mathematics | - | D.C Sancheti, V.K Kapoor |
| 2. Mathematics and statistics | - | Suranjan Saha |
| 3. Statistics for Management | - | Levin Rubin |
| 4. Statistical Method | - | S.P. Gupta |
| 5. Quantitative Methods | - | D R Agrawal |
| 6. Statistics: Theory and Application | - | D C Sancheti, VK Kapoor |
| 7. Fundamentals of statistics | - | D N Elhance |

Reference Books:

- | | | |
|--------------------------------------|---|-------------------------------|
| 1. Business Mathematics | - | D.R Agrawal |
| 2. Quantitative Methods for Business | - | Anderson Sweeney, William 8/e |
| 3. Fundamentals of statistics | - | D N Elhance |
| 4. Business Mathematics | - | Sanchethi and Kapoor |
| 5. Business Mathematics | - | S.M Shukla |

BCA104

Environmental Studies

Course Objective

Expose the basic concept of environment-resource, pollution, management and law and discussing issues endangering life on earth.

Course Outcome

Student will

- Understand basic principle of science which govern natural resources
- Understand resource management and sustainability conflict
- Understand human interference in natural environment

MODULE I: Multidisciplinary nature of environmental studies, Definition, scope and importance Natural Resources: Renewable and non-renewable resources.

MODULE II: Environmental Pollution Definition: Cause, effects and control measure of - Air pollution, water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.

MODULE III: Ecosystem: Structure and function of an ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.

MODULE IV -, Water conservation, global warming, acid rain, and ozone layer depletion,. Environment and human health, Women and Child Welfare. Role of Information Technology in Environment and human health

MODULE V: Biodiversity: - Definition, Types, and Value of biodiversity: Hot-spots of biodiversity. Threats to biodiversity: Conservation of biodiversity:

Reference Books:

1. Agarwal K.C. 2001 Environmental Biology Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, the Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad 380 013, India, Email: mapin@icenet.net(R)
3. Bruinner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB).
5. Cuningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 200,
6. Dr A.K. Environmental Chemistry, Wiley Estern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gloick, H.P. 1993 Water in crisis, Pacific Institute for studies in Deve, Environment & Security. Stockholm Eng. -Institute. Oxford Univ, Press. 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R).
10. Heywood, V.H. & Watson, RT. 1995 Global Biodiversity Assessment, Cabridge Univ. Press 1140p.
11. Jadhav H. &Bhosale, V.H. 1995, Environmental Protection and Laws. Himalaya Pub.House. Delhi 284p.
12. Mckinney M.L. & School RM. 1996, Environmental Science systems & Solutions, Web enhanced edition, 639p.
13. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB).
14. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB).
15. Odum, E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16. Rao M.N. &Datta, A.K. 1987, Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd.
17. Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18. Survey of the Environment, TheHidu (M).
19. Townsend C., Harper J. and Michael Begon, Essentials of Ecology, Blackwell Science (TB).
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol.I and II, Environment Media (R).
21. Trivedi RK., and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
22. Wagner K.D., 1998, Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p. (M)Magazine (R)Reference (TB) Textbook.

BCA105

OFFICE AUTOMATION CERTIFICATION

BCA201
Object Oriented Programming - C++

Course Objective

Developing programmatic solution for real problems by developing object oriented software using class encapsulation and inheritance. It will be based on basic knowledge of algorithms and procedural programming language.

Course outcome

- Student will understand fundamental concept of OOP
- Student will be able to apply object oriented programming in problem solving
- Student will be able to design applet and event handling mechanism in programs

MODULE I: Object Oriented Concepts, Origins of Object-Oriented Design, Object Oriented design concepts, Object Oriented Design methods, class and object definition, Refining Operations, Program Components and Interfaces, Annotation for object-oriented Design. Evolution of OOP, OOP Paradigm, and Advantages of OOP, Comparison between Functional Programming and OOP Approach, Characteristics of Object Oriented Language-objects, Classes, Inheritance, Reusability, User defined Data Types, Polymorphism, and Overloading. Introduction to OOP and C++: Advantages of OOP, Need of object-oriented programming, characteristics of object-oriented languages, C++ and C.

MODULE II: Introduction to C++, Identifier and keywords, Constants, Basic program construction, input/output using cin/cout, Preprocessor Directives, Comments, integer, character, float data types manipulators, Arithmetic operators, Library functions, Variable declaration, statements, expressions, features of iostream.h and iomanip.h., input and output., conditional expression loop statements, breaking control statements C++ Operators., type conversion, Defining a function., types of functions, Structure, Enumerated Data Types., simple functions, Passing arguments to and returning values from functions, Reference Arguments, Overloaded functions, Inline functions, Default Arguments, Variable and Storage classes, Returning by reference, Storage class specifier, recursion, Arrays, structures, pointers and structures, unions

MODULE III: Classes, member functions, objects, Specifying & using class & object, Constructors, copy constructors, public, private & protected, objects as function arguments Array Fundamentals, Arrays as class member data, Arrays of objects., strings, overloading Unary & Binary operators, Data conversion, Pitfalls of overloading & Conversion, Arrays of class objects, pointers and classes, nested classes, constructors, destructors, inline member functions, static class member, friend functions, and dynamic memory allocation, Inheritance, Class hierarchy, derivation, Derived class and their constructs, overriding member functions, class hierarchies, Public & Private Inheritance, Inheritance levels

MODULE IV: Polymorphism, compile time and runtime polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading., Parametric polymorphism. virtual functions., pure virtual functions., Strings, dynamic memory allocation., pointer to objects, new-delete, Linked-Lists, Persistent objects., Streams and files., Virtual, friend and static function, the this pointer, streams, string, character, object I/O, I/O with Multiple objects, File pointers, Disk I/O with member function, Error Handling

MODULE V: Generic function – template function., function name overloading, container classes, member access control, container types, the array string, the ordered collection, the stack, the queue., iteration methods, linked list of objects, creating a container class, Exception handling and Namespaces.

Text Books:

1. Robert Lafore, “Object Oriented Programming in Turbo C++”, Galgotia Publications, 1994.

Reference Books:

1. D. Ravichandran, “Programming with C++”, TMH, 1996.
2. Bjarne Strastrup, “The C++ Programming Language”, Addison-Wesley Publication Co., 1995.
3. Object Oriented Programming in C++: Barkakati, Nabajoti (Prentice Hall of India) 1996
4. D. Parsons, “Object Oriented Programming with C++”, BPB Publication.
5. Schildt Herbert, “C++: The Complete Reference”, 4th Ed., Tata McGraw Hill, 1999
6. “Programming C++” by Yeshwanth Kanetkar

BCA 202
Relational database Management System

Course objective

Student understand and use relational database system to organize and store data in computer. Course objective is to provide concept of functional dependencies and normalization and basic SQL operation.

Course Outcome

- Student will be able to construct ER Diagram
- Role of relational algebra in developing good database.
- Student will be able to normalize data and reduce redundancy
- Create table and write basic query method

MODULE I: Database and Database User, Database System Concepts and Architecture, Data Modeling Using the Entity Relationship Model; Enhanced Entity-Relationship and Object Modeling

MODULE II : Relational Model, Language and Systems,, Relational Data Model, Relational Constraints and the Relational Algebra, Tuples, Relational Algebra, Operators used in Relational Algebra, SQL, Queries, Aggregate Function,, group by operator. SQL-The Relational Database Standard, Examples of Relational Database Management Systems: Oracle and MS Access.,

MODULE III: Object-Oriented and Extended Relational, Database Technology, Concepts for Object-Oriented Database, Object Database Standards, Languages and Design, Object Relational and Extended Relational Database System

MODULE IV: Database Design, Theory and Methodology, Functional Dependencies and Normalization for Relational Databases,, Practical Database Design and Tuning Good and Bad Decomposition, Normalization Functional Dependency 1st, 2nd, 3rd, NF and BCNF, Multi-valued Dependency, 4 NF, Join Dependency, PJNF(5NF), Introduction to File organization, Organization of records in files, Data dictionary storage, ordered indices,, B+ Tree, B- Tree index files, Static, Dynamic Hashing, and Comparison of ordered indexing and Hashing.,

MODULE V: Operational Database, Information and Knowledge, Introduction to ODBC concept., ORACLE Philosophy, SQL Plus, create, alter, insert, update, delete, select, group by, order by, having, grant privileges, aggregate function, Views, join concept, set operations. PL/SQL, Syntax, Data Types, Execution Environment; Stored Procedures and Functions, Error Handling in PL/SQL; Cursors; Database Triggers;

Suggested Books:

1. Data Base Management System - Alexis & Mathews [Vikas publication]
2. Database System - Henry Korth
3. Database System - Bipin Desai
4. Database System - C.J. Date
5. Oracle and Developer 2000 - Ivan Bayross

Text Books:

1. Fundamentals of Database Systems, Author: RamezElmeZElmasri and Shamkant 2. B.Navathe - Third Edition, ISBN : 981-4050-9, Publisher:Addition-Wesley.
3. H. F. Korth and A. Silberschatz: Database Systems & Concepts, McGrawHill Publications.

Reference Books:

1. R. Elmasri, S. B .Navathe: Fundamentals of Database Systems, Benjamin/Cummings Publishing Company.
2. Stefano Ceri, G. Pellagatti: Distributed Databases Principles & Systems, McGrawHill.

BCA 203
Software Engineering

Course Objective

Course aim is to give basic theory of software engineering to apply group software development project.

Course Outcome

- Student will select most desirable software development model
- Apply standard coding
- Understand software requirement specifications for different projects.
- Understand object oriented software development
- Software reuse and reengineering

MODULE I: Software: Characteristics, Components and Applications. Software Engineering – A layered Technology, The Software process, Software Process models, Linear Sequential Model, Prototyping Model, RAD Model and Evolutionary Software models.

MODULE II: Software Process & Project Metrics: metrics in Project & Process Domains, Software Measurement and Metrics for Software Quality. Project Planning Objectives: Software Scope, resources.

MODULE III: Risk Management: Software risks, Risk Identification, Projection. Software Quality Assurance, Software reviews, Formal approach to SQA, Software Reliability, The SQA plan.

MODULE IV: Analysis concepts & Principles, Software prototyping, Specifications, Analysis Modeling, Design concepts, principles & Methods, System Testing, Methods

MODULE V: Object oriented Software Engineering: Object oriented Analysis, Object Oriented Design & Testing, Software Reuse, Reengineering,

Case studies with related topics.

Text Books:

- Software Engineering, A Practitioner's Approach by Rojer S Pressman, Fourth Edition, McGraw Hill.

Reference Book

- Software Engineering – LanSommerville, Pearson Education.

BCA 204 Communicative English

Course Objective

Course objective is to give understanding of communication. Help in abstract preparation, project reports and basic communication letter

Course Outcome

- Student will understand objective of communication and various media.
- Student will be able to write technical proposal
- Student will be able to draft memo and other official document
- Student will be able to understand interview skill

MODULE I:

- What is Communication (An introduction)
- The Communication Process (communication cycle)
- Objectives of communication (types)
- Media of communication (oral, written, audio, audiovisual, face to face)
- Types of communication (Downward, upward, horizontal, grapevine, consensus)
- Principles of communication
- Barriers of communication

MODULE II :

- Body language (facial expressions, gestures)
- Listening and its advantage
- Written presentation of technical material
- Punctuation & use of capital letters (practical exercises)

MODULE III :

- Abstract preparation
- Précis writing
- Agenda of meeting (definition, draft for a given occasion)
- Minutes of meeting (jotting down, minutes book)
- Tools of internal communication – (memo, circular, notes, orders)
- Basic structure of letter (an introduction to different formats)

MODULE IV :

- Requisition letters
- Quotations
- Acknowledgements

- Applications
- Project proposal
- (Basics for different type of letters to be given with practice)

MODULE V :

- Interview skills
- Project Reports
- Resume writing
- Report writing
- Feature write-ups

(Basics for different type of letters to be given with practice)

Note:- The above tasks would be carried out through certain exercises, to name a few- movie screening, dissertation on a selected novel, presentations and public speaking.

Also, the following practices would be observed:

1. A set of exercises in both oral and written communication.
2. Self- managed reading/ writing.
3. Audio and video presentations.
4. Use of print media for explanation of certain topics.

REFERENCE BOOKS

1. Business Communication – K.K.Sinha.
2. Effective Business communication – Herta.A.Murphy,HERBER.W.
3. Effective Business Communication – AshaKaul.
4. Business Correspondence and report writing – R.C. Sharma and Krishna Menon.
5. Communication Skills – Rajendra Pal, J.S.Korlahalli.
6. Letters for all occasions – S.K.Puri.
7. Business Communication – UrmilaRai, S.M. Rai.
8. Business Communication – M.S.Ramesh, C.C.Pattanshetti.
9. Essential Communication Skills – Shirley Taylor.
10. Essentials of Business Communication – Rajendra Pal and J.S.Korlahalli.

Recommended talks -

The following Debate and Talk shows are also recommended to improve communication skills

- The Cross Fire
- The Big Question
- Hard Talk on BBC World

The following **movies** are recommended to understand the cross-cultural communication

- East is East
- Hyderabad Blues
- Bend it like Beckham

Desktop Publishing

Course Objective

Objective of the course is to provide basic software handling which is useful in day to day work requirement other than office work.

Course Objective

- Student get ability to understand the uses of desktop publishing
- Student get ability to operate coral draw
- Student get ability to work on Photoshop
- Manipulate text and graphics to create a balanced and focused layout.
- Create fliers, brochures, and multiple page documents.

Module-1

Introduction to DTP, Introductions to Printing, Types of Printing, Offset Printing, Working of offset Printing, Transparent Printout, Negative & Positives for Plate were making, Use of Desk Top Publishing in Publications, Importance of D.T.P in Publication, Advantage of D.T.P in Publication, Mixing of graphics & Image in a single page production, Laser printers - Use, Types, Advantage of laser printer in publication.

Module-2

Introduction to adobe PageMaker/In-Design, PageMaker tool box, PageMaker palettes Menus, Icons and dialog box, the control palette, page layout, creating and saving documents, typography, Modifying character attributes, importing graphics, Editing and cropping images, Using the picture palette, The color palette.

Module-3

Introduction to Coral Draw graphics, Features of Corel Draw, Corel Draw Interface, Tool Box, Effects, Drawing and Coloring, Creating Basic Shapes, Working with Bitmaps, Applying effects on Bitmaps, Introduction o Text Tool, Artistic and paragraph text, Wrapping Text around Object.

Module-4

Introduction to Basics of Quark express, navigating a QuarkXPress Document, Setting Up the Document, multi-page documents, formatting text, Manipulating Graphics.

Module-5

Introduction to Photoshop, Understanding Tools & Workspace, Image/Photo Editing -Mixing-Enhancements, Converting Color to b/w and b/w to Color, Shortcuts to work Efficiently, Creating Web Graphics.

TEXT & REFERENCE BOOKS:

Adobe PAGE MAKER .

PRAKHAR COMPLETE COURSE FOR DTP (CORELDRAW, PAGEMAKER, Quark express PHOTOSHOP)

Practical LAB:

Complete Page Maker S/W

Complete Adobe Photoshop

BCA301

Data Structure using C++

Course Objective

Objective is to provide knowledge about various data structure and its implementation using language C++.

Course Outcome

- Student will be able to understand different structure to store data
- Notion of abstract data type & recursive access on them
- Analyze data structure impact on algorithms, program design and program performance
- Explain, implement and use link list, stack and queue

MODULE I: Introduction to Algorithm Design and Data Structure, Top down and Bottom-up approaches to algorithm design, Recursive and iterative algorithms, Divide and conquer method, Greedy method, branch. Introduction of array (single & multi-dimensional arrays), Implementation of 1-D arrays, Row and Column Major Implementations of 2-D, 3-D and n-D, arrays Applications of arrays.

MODULE II: Definition of Data Structure, Types & characteristics of Data structures, Abstract Data Type (ADT), Stack as an ADT, operations on stack, Stack implementation using array, Application of Stack: Recursion, conversions from Infix to postfix & prefix and evolution of prefix expressions using stack. Queue as ADT, Operations on Queue and Types of queues, Queue implementation Using Array.

MODULE III: Linked list, Concept of a Linked List, Singly linked list (Operations on list), Linear Single and Double lists, stacks and queues implementation using Linked list, polynomial representation and manipulation using linked list, Application: Reading and writing polynomials, polynomial addition, Circular linked list and doubly linked list, traversal – searches, insertion and deletions, Generalized list, sparse matrix representation using generalized list structure

MODULE IV: Trees, Definitions of n-ary, binary trees, Complete Binary Tree, Weight of a tree, Level of a node, Height/Depth of a Tree. Operations on tree, Tree Search Algorithms, Binary Search Tree, Tree traversal Algorithms, Logical level of binary search tree, BST transversal methods (Preorder, Postorder and Inorder), Recursive and non-recursive algorithms for traverse method, Insertion into and deletion from a BST and their implementation, preorder and Postorder, traversal, Insertion in Threaded tree,

MODULE V: Searching and Sorting, Sequential and binary searches, Indexed search, Hashing schemes, Sorting methods: Bubble Sort, Sequential Sort, Shell Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort. Definitions of vertex edge and Graph, Types of graphs directed / undirected, connected / disconnected, cyclic / acyclic, Representation of graphs: Adjacency matrix, linked list

Text Book:

- Data Structures via C++: Objects by Evolution, by A Michael Berman.

Reference Books:

1. Data Structures and Algorithms in C++ by Michael T Goodrich, Roberto Tamassia.
2. Algorithms and Data Structures in C++ by Alan J. Parkar.
3. Applied Data Structures with C++ by Peter Smith.
4. Object Oriented C++ Data Structures for Real Programmers by Jan L. Harrington.

BCA302

Computer Graphics

Course objective

Graduates understand the graphic working process inside the computer and how algorithms are helpful in drawing different graphical design.

Course outcome

- Graduates will know basic concept of graphics in computer domain
- Graduates will draw line using algorithm
- Graduates will transform 2D object.
- Graduates understand 3D image processing basics.

MODULE I: Introduction to computer graphics, the advantages of Interactive Graphics, applications of computer graphics, Vector and Raster graphics fundamentals, Point plotting, Line drawing algorithms, Simple DDA, Symmetric DDA and Bresenham's Line Drawing algorithms for all quadrants, Scan Converting Lines, Scan Converting Circles, Mid-point algorithm.

MODULE II: Graphics devices, different graphics Input / Output devices, Hardcopy Technologies, Display Technologies, Raster-Scan Display Systems, The Video Controller, Random-Scan Display Processor, Input Devices for Operator Interaction, different types of printers and Image Scanners, Geometric transformations, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Composition of 2D Transformations

MODULE III: Clipping and Windowing, Window, View port, window to viewport transformations, clipping techniques, point clipping, line clipping algorithm, polygon clipping algorithm, Cohen Sutherland algorithm, polygon inside outside test, polygon fill and boundary fill algorithm

MODULE IV: Selective modifications, Display File segmentation, implementation of display file segmentation, Introduction to 3D coordinate system, 3D Projections, perspective and parallel projections, 3D Transformations, translation, scaling and rotation, rotation about plane, rotation about a pivot point in a 3D plane, composite transformation

MODULE V: Curves and surfaces, Bezier curve, Realism in 3D, solid figure representations, intensity variation, surface rendering and hidden surfaces. Introduction to computer animation, 3D software development packages, design of graphics package, features and characteristics of a 3D graphics package

Text Book:

- Foley, J.D. & Van Dam, A: Fundamentals of Interactive Computer Graphics.

Reference Books:

1. R.A. Plastock and G. Kalley, "Computer Graphics", McGraw Hill, 1986.
2. D. Hearn and M.P. Baker, "Computer Graphics", PHI New Delhi; Second Edition, 1995.
3. Max K Agoston, "Computer graphics and geometric modeling".
4. James D Foley, "Computer graphics: Principles and practices in 'C'".
5. Schaum Series "Computer graphics".

BCA303

Discrete Mathematics

Course Objective

Graduates will be able to understand mathematical used in different courses for implementing algorithm and logic

Course Outcome

- Graduates get skill to understand set concept of mathematics.
- Student will perform Boolean algebra for logic building
- Student get ability to draw graphs of given problem

MODULE I: Arbitrary Cartesian product of sets, Equivalence relations, partition of sets, injective, surjective, bijective maps, binary operations, countable, uncountable sets.

MODULE II: Recall of statements and logical connectives, tautologies and contradictions, logical equivalence, algebra of propositions quantifiers, existential quantifiers and universal quantifiers.

MODULE III: Boolean algebra and its properties, algebra of propositions as an example, De Morgan's Laws, partial order relations g.l.b, l.u.b, algebra of electric circuits and its applications, Design of simple automatic control system.

MODULE IV: Boolean functions- disjunctive and conjunctive normal forms. Boole's expansion theorem, fundamentals forms, many terminal networks

MODULE V: Basic Concepts of Graph Theory, Subgraphs, Trees and their properties, Binary trees, spanning trees, Directed trees, Planar graphs, Euler Circuit, Hamiltonian Graph, Chromatic number

Text Books:

1. Discrete Mathematics - Dr.H.K.Pathak
2. A textbook of discrete Mathematics - Swapan Kumar Sarkar
3. Graph Theory with application - C. Vasudev

Reference Books:

1. Discrete Mathematics - C.L.Liu T.M.Hill
2. Graph Theory and its applications - Narsingh Dev.

BCA304
Entrepreneurship

Course objective

Graduates will learn basic entrepreneurial concept and become able to use skill to take leading role.

Course outcome

- Graduates get ability to become entrepreneur
- Graduates understand issues faced by Indian entrepreneur and global scenario.
- Graduates know about entrepreneurship development programme.

MODULE I: Introduction- Entrepreneur-entrepreneurship-and-enterprise: conceptual issues. Entrepreneurship versus Management . Entrepreneurship versus Intrapreneurship. Qualities of an entrepreneur: Role of entrepreneurship in economic development. Role and functions of entrepreneur in relation to new venture creation, especially in the developing country context. Small business as the seedbed of entrepreneurship – contemporary discourse on small and medium enterprises.

MODULE II: Theories of entrepreneurial Emergence: Economic, Sociological and Psychological Perspectives. Entrepreneurial competencies motivations, performance and rewards: The concept, metrics and role in entrepreneurial manifestation and sustenance entrepreneurship as a creative and dynamic process. Innovation and entrepreneurial orientation in a developing economy.

MODULE III: Global Entrepreneurship monitor (GEM) Project and total Entrepreneurship Index (TEI). India's rank and the issues facing Indian Entrepreneurship. Prominent business families and communities. Issues involved in family business, especially those pertaining to accessing support for one's business ideas, assuming and asserting one's role in family business, and, leadership succession. The contemporary role models in Indian business: their values. Business philosophy and behavioural orientations.

MODULE IV: Entrepreneurial Development Programmes: their role, relevance and achievements; Role of Government in Organizing EDPs; Critical Evaluation; Problems and Constraints.

MODULE V: Reach of the various promotional programmes, evaluation of their effectiveness and the ways and mean of accessing the available help. Role of industries/entrepreneur's associations and self-help groups. The idea of business and sources of business ideas. Opportunity sensing via personal observation, vicarious experience, primary surveys and secondary data analysis. Role of business consultants/ mentors, entrepreneurship trainers, and, family-and community networks in identifying business opportunities. Compatibility of the business idea with the personal profile of the entrepreneur. Tools and techniques of Economy- sector- Industry analysis and projections.

Text/Reference Books:

- Harell (1995), 'For Entrepreneurs Only', New Jersey Career pub.
- Vikram Sarabhai, (1974), 'Management for development' Vikas pub.
- Rajagopal, Entrepreneurship and Rural Markets
- Ovmerod A, (1992), 'Textile, Project Management', the textile Institute.
- Rerry and Franklin, (2002), 'Principals of Management'. AITBS.
- Acharya B.K and Gonekan P.B. (1985) "Marketing and sale Management", Bombay, Himalaya publication house

BCA305

Computational Accounting Statistical Tool

BCA401

Programming using VB.net

Course Objective

Graduates get knowledge of .Net framework and GUI based interface development concept.

Course outcome

- Analyze a given problem and implement an algorithm to solve the problem.

- Implement the visual basic language constructs in the right way
- Design, develop and test applications written in visual basic

MODULE I: Introduction to .NET: - NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to visual studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. The environment: Editor tab, format tab, general tab, docking tab. visual development & event drive Programming - Methods and events.

MODULE II: The VB.NET Language: Variables -Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable Number of Argument Optional Argument, Returning value from function. Control flow statements, conditional statement, loop statement. MsgBox & Inputbox.

MODULE III: Object oriented Programming: Classes & objects, fields Properties, Methods & Events, constructor, inheritance. Access Specifiers, Public Private, Protected. Overloading, Friend, Overloading Vs Overriding, Interfaces, Polymorphism, My Base & My class keywords. Overview of OLE, Accessing the WIN32 API from VB.NET & Interfacing with office 97, COM technology, advantages of COM+, COM & .NET, Create User control, register User Control, access com components in .net application.

MODULE IV: Working with Forms: Loading, showing and hiding forms, controlling one form within another. GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar. Their Properties, Methods and events. OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label. Designing menus, ContextMenu, access & shortcut keys, System.io Namespace, Reading and Writing data from and into files, File class and related Methods, Stream Reader, Stream Writer , Binary Reader, Binary Writer class, File and Directory Classes,

MODULE V: Databases in VB.NET: Databases, Connections, Data adapters, and datasets, Data Reader, Connection to database with server explorer, Multiple Table Connection, Creating Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on Data grid. Data binding with controls like Text Boxes, List Boxes, Data grid etc. Navigating data source, Data Grid View, Data form wizard, Data validation, Connection Objects, Command Objects, Data Adapters, Dataset Class, Overview of ADO, from ADO to ADO.NET, Generate Reports Using Crystal Report Viewer. Crystal Report : Connection to Database, Table, Queries Building, Report, Modifying Report, Formatting Fields and Object, Header, Footer, Details, Group Header, Group footer, Working with formula fields, Parameter fields, Group, Special fields, Working with Multiple Tables, SQL in Crystal Report, Report Templates

TEXT & REFERENCE BOOKS:

1. VB.NET Programming Black Book by Steven Holzner - Dreamtech Publications.
2. Mastering VB.NET by Evangelos Petroustos - BPB Publications.
3. Introduction to .NET framework - Wrox Publication.

BCA402

Principal of operating system & Linux concept

Course objective

Graduates be able to understand basic concept related to operating system. Graduates will able to run Unix Operating system command and get familiarity with windows.

Course outcome

- Analyze the concept of processes in operating system and booting process.
- Graduates get ability run basic commands of Unix
- Graduates get familiarity with windows and other well known operating system
- Graduates understand real time operating system

Module-I

Introduction to Operating Systems, Types of operating systems, Major components of OS, BIOS, IVT, BIOS versions, Dual booting, Various Operating system architectures, Design Principles, Operating Systems for tiny devices (like mobile, tablets, set-top boxes).

Module-II

Introduction to Unix, versions of Unix, Kernel architecture, Unix Shell and its types, File system, Structure of the inode, etc. Memory Management in Unix. Process States, Process State Transition, Process Control Block (PCB), Parent-child relationship, The different segments of a process, Internal and external commands, Process creation basics (fork() and wait()), Role of init in process creation and in spawning user shells, Exporting variables (export) and consequences, Exit status of a process (%?), Displaying process attributes (ps), Killing processes (kill), Running commands in background (& and nohup), Job control (fg, bg and [ctrl-z]), Scheduling processes (cron), Interprocess communication in UNIX.

Module-III

Introduction to Linux, versions of Linux, Kernel architecture, File system- ext2, ext3, ResierFS, Journaling capability, Linux Booting process, Boot strap loader- LILO, Grub. Memory Management in Linux. Linux Shell and its types, concept of X-Window, KDE, Gnome. Understanding shells, Processes in linux, process fundamentals, connecting processes with pipes, Redirecting input output. Background processing, managing multiple processes, changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep.

Module-IV

Microsoft Windows families, Windows NT family, Windows File Systems, Booting Sequence, Windows 8 as Case Study: Architecture, aero and metro interfaces. Introduction to Apple's Mac OS X, basics, The Mac OS X File Structure, File Organization, memory, Units of Measure, storage, and organization methods. Utilities: Essential Tools for Managing and Maintaining Mac.

Module-V

RealTime Operating System: Principles, Semaphores and Queues, Hard RealTime Scheduling Considerations, Saving Memory and Power, An example RTOS like uCOS (Open Source).

Text Books and References:

- "Operating Systems Design & implementation", Andrew S. Tanenbam, Albert S. Woodhull Pearson.
- Operating System Concepts (7th Ed) by Silberschatz and Galvin, Wiley, 2000.
- Sumitabha Das, Unix : Concepts and Applications, Third Edition, 1998, Tata McGraw Hill.
- Refer Research Papers and Google Scholar.

Data Communication and Network

Course Objective

Objective is to provide concept of data communication and familiarized with the basic protocol of computer networks.

Course Outcome

- Identify the different component in a communication system and their respective tools
- Describe the technical issues related to the local area networks
- Identify the common technologies available in establishing LAN infrastructure

MODULE I: Introduction to Computer Networking and OSI Layer; Concept of Networking, Data Communication, Required network elements, the role of Standards Organization. Various Topologies, Transmission Mode, Categories of Networks- LAN, MAN, WAN. The benefits of a Computer Networks, The Concept of Layered Architecture, Functions of the Layers. Comparison between OSI and TCP/IP Reference model

MODULE II: Transmission of Digital Data; Shannon's and Nyquist theorems for maximum data rate of a channel. Transmission media- Co-axial, UTP, Fiber Optic and wireless. DTE-DCE interface using RS-232C

MODULE III: Multiplexing and Switching; The Static and Dynamic channel allocation, The Concept of Multiplexing- FDM, TDM, WDM. The Concept of Switching- Circuiting, Message switching, Packet switching

MODULE IV: Data Link Layer and Routing Algorithms ;Line Discipline, Flow Control- stop and wait, sliding window, Go back N, Error Control- ARQ stop and wait, sliding window ARQ. HDLC, SLIP, PPP. Multiple access protocols- CSMA/CD. IEEE standards for LAN's and MAN's. The IP protocol, IP address classes and subnet mask, the concept of ICMP, ARP, RARP

MODULE V: Transport and Application Layer; The Concept of client and Server in Transport layer, The Concept of Domain Name System, Various Resource Records, Architecture and services of E-mail (RFC-822 and MIME), The Concept of World Wide Web- server side and client side

Text Books:

1. Computer Networks – Third and Fourth Edition By Andrew Tanenbaum (PHI Pub.)
2. Data & Computer Communication – Sixth Edition by William Stallings (PHI Pub.)

Reference Books:

1. Computer Networks– A S Tanenbaum.
2. Data Communication and Networking- Forouzan.

BCA404
MINI PROJECT

BCA405
Client Server Architecture Implementation and Troubleshooting

BCA501

Programming in Core JAVA

Course Objective

To impart the basic concepts of Java Programming and to develop understanding about Basic object Oriented design using UML and Applet

Course outcome

- Understands fundamental constructs of OOP.
- Gets the knowledge of different forms of OO Implementation.
- Apply object oriented programming concepts in problem solving through JAVA.
- Design and implement Applet and event handling mechanisms in programs

MODULE I: Introduction History of Java , Application of Java, Java Virtual Machine ,Byte code, Procedure-Oriented vs. Object-Oriented Programming , Object Oriented Programming Concepts Abstraction ,Encapsulation, Polymorphism and Overloading , Setting Up Your Computer; Writing, Compiling, Interpreting and Running the program, Common errors , Holding Data, Primitive Data Types, Integers, Floating-Pint types, Characters, Booleans, User-Defined Data Types, Declaration, Constants, Identifiers, Literal, Type Conversion and Casting, Objects and Wrapper Classes, Variables, Variable Definition and Assignment, Default Variable Initializations, Command Line Arguments, Array of Primitive Data Types, Comment Syntax, Garbage Collection, Controlling the flow, Expression, Operators & its types, control statements & its types.

MODULE II: Fundamental of Classes :A simple class, Creating Class instances, Adding Methods to a class, Calling Function/Methods, Using 'this' Keyword, Constructors & its types, More on Methods: Passing by value, by Reference, Access control, Methods that Return Values, Method Overloading, Recursion : Nested and Inner classes: Inheritance & Packaging : Inheritance : Using extends keyword, Subclasses and Super classes super keyword usage, overriding Methods, Dynamic Method Dispatch, The object class, abstract and final classes, Packages : Defining a package, importing a package, Access control, Interfaces: Defining an interface, implementing and applying interface.

MODULE III: Exceptions: Introduction, Exceptions syntax, Exception Categories, Using Exceptions, JAVA Applications, Build a simple command-line application, Java applet, Applet Life cycle , <Applet> tags ,Applet methods ,Basic applet configuration ,Build a simple applet Threads and Multithreading, The Lifecycle of a thread, Creating and running threads, Creating the Service Threads, Schedules Tasks using JVM, Thread-safe variables, Synchronizing threads, Communication between threads. Java Bean: Introduction, Creating and Using bean, JDK tools.

MODULE IV: Intro to GUI Applications, Intro to AWT , Containers, Components, Layout Manager, Frame and Panel Containers, User Interface Events, Adapter Classes, Introduction to JFC and Swing, Features of the Java Foundation Classes, Swing API Components, JComponent Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, Check Boxes, Menus, Toolbars, Implementing Action interface, Pane, JScrollPane, Desktop pane, Scrollbars, Lists and Combo Boxes, Text-Entry Components, Colors and File Choosers, Tables and Trees.

MODULE V: Overview of Networking, Working with URL, Connecting to a Server, Implementing Servers, Serving multiple Clients, Socket Programming, Internet Addresses, URL Connections, Accessing Network interface parameters, Stream: Introduction, types , Java.io package, Node streams, Processing streams, Readers, Writers, Creating Streams, Serialization Interface, Accessing database data using Java ,Driver types ,Statement, Prepared Statement and Callable Statement, Retrieving and using the ResultSet ,Using ResultSetMetaData, DatabaseMetaData

Text Books:

1. Complete reference java 2 – Herbirt Schildt Pub. TMH.
2. SAMS teach yourself Java – 3rd edition Roger Cedenhead, Pearson Publication.

References Books:

1. Programming in java – E. Blaguswami
2. Beginning Java programming – Wrox Series
3. JAVA Certification - Khalid Mughal.

Web Designing

Course objective

Graduates get exposure for web pages, CSS, Java script and protocols.

Course Outcome

- Graduates get ability to make web pages
- Graduates get ability to develop web pages using Java script
- Graduates get skill in XML

MODULE I: Exploring the World Wide Web, World Wide Web Consortium, Architecture of WWW, Web protocols, HTTP, HTML, URL, Web Standards, HTML – Versions, Editor, Elements in HTML Documents, HTML Elements, and HTML Tags – Container Tag, Empty Tag, Tag Attributes, Viewing the source of a web page. HTML Document Structure – Head Section, Markup elements with head: Base element, Is Index element, Link element, Meta element, Title element, Script element; Body Section – Body elements: Background, Text Body, Address element, Block quote element, Comments in HTML.

MODULE II: DOCTYPE declaration, META tags , Tables - Learn the basic structure of a table ,Learn how to create table rows and columns for layout, Tables for layout- Cell padding and cell spacing, Cell alignment, Background images in tables ; Links, Lists and Images, create links to other pages/sites, add images to web page ,Forms and Validation ,Understand the structure of forms ,Input Types – Text, Password, Checkbox, Radio, Submit and Reset, Text area, Drop Down Menu or Select Menu Tag, Image Buttons. Frames –Overview, Use of no-frames, Frame Targeting.

MODULE III: CSS in a Nutshell, the Benefits of CSS ,How CSS Works ,Rule Syntax ,Adding Styles to a Document ,Key Concepts ,Specifying Values, Browser Support , Type (Element) Selector - Contextual Selectors, Class and ID Selectors, Attribute Selectors, Font Family ,Font Size ,Other Font Settings ,Text Transformation (Capitalization) Text Decoration, Line Height, Text Alignment Properties, Text Spacing, Text Direction, Margins, Borders, Padding, Foreground Color, Background Color, Background Images, The Essence of Tables, Styling Tables, Borders, Table Layout (Width and Height), Table Display Values, Styling Background, Styling Lists, CSS Box Model.

MODULE IV: JavaScript, JavaScript Syntax, Java Script Statements, Java Script Comments, Java Script Variables, Java Script operators, Java Script comparisons, Conditional Statements: If else, Switch, Popup Boxes, Compound Statements: loops, 'while', and 'for' Functions, Nesting Conditionals: 'else if' and 'switch', Logical Operators: Boolean values ,Data Arrays, Debugging ,Program Development in General ,Multi-dimensional Arrays.

MODULE V: XML Basics, How It Works, XML Document Syntax, Well-Formed XML, XML Namespaces, XML on the Web ,Web-Related XML Applications , The Role of HTML , Markup Basics , Introduction to XHTML , XML Tree, XML Syntax, XML Elements, XML Attributes, XML Validation, XML Validator, XML Viewing.

Reference Books:

1. Web Redesign: Workflow that Works
2. HTML & XHTML: The Complete Reference Guide, 5th Edition
3. The Non-Designer's Web Book, 3rd Edition
4. JavaScript Concepts and Techniques
5. 'The Unfair Advantage Book on Winning the Search Engine Wars', An e-Book from Planet Ocean Communications
6. Web Design in a Nutshell, Second Edition by Jennifer Niederst Robbins, Second Edition September 2001
7. Learning Web Design: HTML, Graphics, and Animation
8. A Beginner's Guide to HTML, Graphics, and Beyond by Jennifer Niederst Robbins

BCA503
Elective I
OPTIMIZATION TECHNIQUES

Course Objective

Objectives of the course is to introduce the fundamental concepts of optimization Techniques, make the learners aware of the importance of optimizations in real scenarios.

Course Outcome

- formulate optimization problems
- understand and apply the concept of optimality criteria for various type of optimization problems
- solve various constrained and unconstrained problems in single variable as well as multivariable
- apply the methods of optimization in real life situation

MODULE I: Introduction to O.R. Scope of operations research, Operational research modeling- definition and scope of operational Research, Linear programming: formulation, Identification for decision variable, construction of objective function and constraint, assumption, convex sets, Feasible, Basic feasible, and optimal solutions, Extreme point and graphical method

MODULE II: Linear Programming Problem: Introduction, formulation of LP problems, Graphical solution, Simplex method: Artificial variable techniques Big-M- method (Charné's penalty method), Concept of Duality: Definition of primal and dual

MODULE III: Transportation model: Introduction, mathematical formulation Existence of Feasible solution, Basic feasible solution, and optimum solution, Methods for initial feasible solution: North- west corner rule, Row minima method, Column minima method, Low cost entry method, Vogel's approximation method moving toward optimum solution, Assignment Models: Mathematical formulation of assignment problem, Hungarian Method for assignment problem

MODULE IV: The terminology of networks: Graphs, Nodes, Branches etc. Network diagram representation, Rules for drawing Network diagram, Time estimates and critical path in network analysis, Examples on optimum duration and Minimum duration, Project evaluation and review Technique,

MODULE V: Short review of probability theory, Basic structure of queuing models, Input source, queue, Service discipline, Service Mechanism, Terminology and notation, Steady state solution of Markovian queuing models. M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space

Text Books:

1. Operations Research : KantiSwarup, P.K Gupta
2. Operations Research : V.K. Kapoor
3. Quantitative techniques in management : N.D. Vohra
4. Operations Research: An Introduction, 7th Edn. H. Taha, PrenticeHall, 2002
5. Linear Programming and Extensions, G Dantzig, Princeton University Press, 1963

Elective I
GRAPH THEORY

Course Objective

Students will come across a number of theorems and proofs. Theorems will be stated and proved formally using various techniques. Various graphs algorithms will also be taught along with its analysis.

Course Outcome

After the course the student will have a strong background of graph theory which has diverse applications in the areas of computer science

MODULE I

Definition of a graph-finite and infinite graphs - incidence and degree - sum of degrees equals twice the no. of edges (Proof included) - Degree sequence - isolated vertex - pendant vertex – null graph - regular graph-isomorphic graph – sub graphs –walks – paths – circuits - connected graphs - disconnected graphs - components of a graph - operations on graphs – Euler path & Euler graphs – Hamiltonian Paths & Graphs – Weighted graphs (No Theorems)

MODULE II Definition of Trees – Properties of Trees - Pendant Vertices in a Tree - Distance and centers in a Tree - Rooted and Binary Trees - Spanning Trees. (No theorems), Trees with directed edges - Arborescence

– fundamental circuits in digraphs- Matrices A,B & C of digraphs - Adjacency Matrix of digraphs (No Theorems)

MODULE II Cut sets and Cut vertices – Fundamental circuits and cut sets – Edge Connectivity - Vertex connectivity – Separable Graphs – Planar Graphs - Kuratowski's graphs – Different representations of Planar graphs (No Theorems).Incidence Matrix A – Circuit Matrix B – Fundamental Circuit Matrix – Cut Set Matrix C - Relationship between A,B and C - Path Matrix – Adjacency Matrix.

MODULE III Coloring of a Graph , Chromatic number - Chromatic Partitioning – Chromatic Polynomial – Coverings - Four Color Problem (No theorems)Definition of Directed Graphs & Related definitions - Directed path and connectedness -Euler digraphs

MODULE V Graph Theory - an Algorithmic approach – Detecting a Spanning Tree - Detecting cut vertices and separability – Detecting a shortest path from a specified vertex to another specified vertex – Detecting a shortest path between all pairs of vertices – Planarity testing.

TEXT BOOK :

- Narasingh Deo : “ Graph Theory with Applications to Engineering and Computer Science” , PHI-India
- F Harary : “Graph Theory” , Narosa Publishing House

BCA504
Elective II
Research Methodology

Course Objective

Become knowledgeable of the research process and its different approaches. Develop critical thinking to find business opportunities and to solve questions related to service industries

Course Outcome

- Apply a range of quantitative and / or qualitative research techniques to business and management problems / issues
- Understand and apply research approaches, techniques and strategies in the appropriate manner for managerial decision making
- Demonstrate knowledge and understanding of data analysis and interpretation in relation to the research process

MODULE I Meaning, Objectives and Motivation in Research, types of Research, Research Approaches, Research Process, Validity and Reliability in Research, Obstacles in accepting research. Problem Formulation, Hypothesis Formulation, types of Hypothesis, characteristics of Good Hypothesis Meaning and Significance of Research Designs, Features of a good research design, types of research design, contents of research design

MODULE II Census Vs. Sample. Steps in Sample Design. Determining the size of Sample. Sampling methods - Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling, Selective Sampling. Types of Data, Sources of Data – Primary and Secondary Data. Methods of collecting the data. Testing the validity of the data.

MODULE III Measurement and scaling techniques, errors in measurement, tests of sound measurement, scaling and scale construction techniques

MODULE IV Steps in Questionnaire design, characteristics of a good questionnaire Presentation, Processing & Analysis and Interpretation of Data. Report Writing – layout of a Research Report, Characteristics of a good research report

MODULE V Measures of Central Tendencies and Dispersions – Simple Numerical Calculations for understanding the characteristic values Linear Correlation and Linear Regression – 2 Variables

References:

- 1) Research Methodology Methods & Techniques - C. R. Kothari, New Age International
- 2) Statistical Methods - S. P. Gupta, Sultan Chand, New Delhi
- 3) Business Research Methods - William G. Zikmund, Thomson South-Western
- 4) Introduction to Quantitative Research Methods - Mark Balnaves and Peter Caputi, Sage Publications

Elective II
MIS

Course Objective

students are able to understand the usage of Information Systems in management. The students also would understand the activities that are undertaken in acquiring an Information System in an organization.

Course Outcome

- Record the current issues of information technology and relate those issues to the firm
- Reproduce a working knowledge of concepts and terminology related to information technology
- Analyze how information technology impacts a firm
- Interpret how to use information technology to solve business problem.

MODULE I: MIS Concepts, definition, scope of MIS, Importance of MIS, Structure of MIS, classification of MIS, information, types of information, information quality, dimensions of information system definition, kinds of systems, system related concepts, elements of system

MODULE II: Computer system, hardware classification, computer software, programming languages, database management system, database structure, data models, sql, telecommunication, types of signals, communication channel characteristics of channel, network, types of network

MODULE III: E-commerce, Types of ecommerce, Electronic commerce and trade cycle, Business strategy, strategic implementation of IT, strategy formulation and implementation planning, e-commerce implementation, e-commerce evaluation ,decision making concept, types of decisions, decision making and MIS, decision support system, characteristics and capabilities of DSS

MODULE IV: Concept of the business process re-engineering (BPR), System development Cycle, System Planning and the Initial Investigation, information gathering tools requirement determination, strategies for requirement determination, structured analysis tools

MODULE V:Implementation process, hardware and software selection , system maintenance, evaluation of MIS, information system planning, planning terminology, models of information system planning, selecting a methodology, Information Resource management

Reference/ Text Books:

- Management Information System – D. P. Goyal
- Management Information Systems: Solving Business Problems with Information Technology,
- 3/e Gerald V. Post, University of the Pacific, David L. Anderson, DePaul U/McGowan Center.

BCA505
Industrial/Company/Professional Training

BCA601
Advanced JAVA Programming

Course Objective

Objective of this course is to provide the ability to design console based, GUI based and web based applications. Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications

Course Outcome

- Graduates get ability to implement java database connectivity and ODBC bridge connectivity
- Graduates get ability to understand and implement RMI
- Graduates get ability to handle CGI and servlet
- Graduates get basic understanding of EJB

MODULE I: Java Database Connectivity: JDBC architecture; Drivers, JDBC-ODBC bridge, native API partly java driver, Net Protocol all Java driver, Native protocol all Java driver; Connecting to Database; statements; Multiple result sets, Java Database Connectivity: JDBC architecture; Drivers, JDBC-ODBC bridge, native API partly java driver, Net Protocol all Java driver, Native protocol all Java driver; Connecting to Database; statements; Multiple result sets.

MODULE II: Remote Method Invocation, RMI Architecture Working with distributed objects ,3 phase deployment Creating the interfaces ,Using the RMI compiler ,RMI Register, Creating Stubs and Skeletons, Running the RMI registry ,Creating and Binding Objects , Java Naming and Directory Interface, JNDI Overview ,JNDI API , Calling the objects from the client ,Java and CORBA, What is CORBA? , Using Java IDL, Creating and running a CORBA application, Using IIOP for distributed applications, Creating and Running RMI/IIOP applications.

MODULE III: Overview of the J2EE Technologies, Components & Containers , J2EE framework and functionalities 2/3/N-tier Architecture ,Benefits of working server side using Java ,Web Architecture and Fundamentals, Servlet Vs CGI ,WAR file, Servlets API , Life cycle Phase and methods, Get and Post , Session Tracking, Session Interface, Servlet Config, Servlet Context, Forward/include/ send redirect, servlet chaining, deployment descriptor.

MODULE IV: Introduction to JSP ,Basic JSP Syntax ,Java Server Pages, JSP Vs Servlet, MVC Architecture ,JSP Scripting Tags, JSP Attributes, JSP implicit Objects, JSP Action.

MODULE V: Introduction to EJB, EJB Overview and architecture, EJB container, Types of EJB, life cycle of EJB, CMP VS BMP life cycle phase and Methods, State less Vs. Statefull bean and life cycle, Enterprise Archive, EJB Deployment.

Text Books:

- Servlet and JSP Programming, O'Reilly.
- Core Servlets & JavaServer Pages, 2nd Edition, SUN.
- Enterprise JavaBeans 3.0, by Richard Monson-Haefel, Bill Burke.

Reference Books:

- Building Java Enterprise Applications.
- Java Servlet Programming, Second Edition.

BCA602
Introduction to .Net Framework and C#

Course Objective

This course is designed to provide the knowledge of Dot Net Frameworks along with C#

Course Outcome

After completion of the course the student will be able to use the features of Dot Net Framework along with the features of C#

MODULE I: Introduction to .Net, what is .Net environment, .Net framework, features of .Net platform, future of .Net, introduction to Common Language Runtime(CLR), Microsoft Intermediate Language, Class libraries, .Net Framework Base Classes, Common Language Specifications (CLS), Console applications, introduction to Windows Form, Web Forms, introduction to Web services, languages supported by .Net,

installation of .Net framework and C# compiler, Installing Visual Studio .Net, introduction to Microsoft IDE, introduction to VB.Net, ADO.Net, XML.Net

MODULE II: Introduction to C#, syntax and structure of C#, differences between C++ and C#, creating the source code, compiling, intermediate language code and execution, C# keywords, literals and identifiers, C# expressions, operators and statements, namespaces and 'using' keyword, C# data types, constants, creating references, variable declaration, Class declaration, understanding System namespace, operators precedence and hierarchy, conditional statements, If, If-Else construct, nested If-Else, switch statement, loop constructs, while, for, for each statements, break, continue statements, data type conversion, creating console applications.

MODULE III: C# and OOPS, features of OOPS, Classes and Objects, public static void main method, methods and data members, nested classes, use of Static variable, creating properties, property accessor methods, constructors and destructors, Finalizers, structure, enumerators and arrays, multidimensional array, checking array lengths and bounds, overloading methods, overloading constructors, using variable number of parameters, learning scope, namespaces and nested namespaces, naming a namespace, exceptions and exception handling, try, catch, finally statements, defining and throwing own exceptions, working with Inheritance, Abstract classes, exploring polymorphism, operator overloading and virtual methods.

MODULE IV: Understanding console Input and Output, formatting numbers, date and time and strings, Working with String Class, using String class methods for reading and writing, building Strings, Introduction to Interfaces, Classes versus Interfaces, using and defining interfaces, using multiple interfaces, using Explicit interface members, working with Events, Delegates and Indexers, creating events and event handlers, multiple event handler, Classes in the .Net Framework, checking out the framework classes, working with timer, getting directory and system environment information, working with Math routines, working with Files, copying a File, getting information about a File, understanding streams, creating and opening files, working with simple data files, understanding the order for reading files.

MODULE V: Introduction to Collection classes, using generic collections, generic methods and generic interfaces, working with List, String etc, introduction to nongeneric classes, using nongeneric classes, working with Array List, Linked List, Queue, Stack etc, advantages of generic over nongeneric, template classes, creating our own generic classes, creating our own generic methods, creating our own generic interface, introduction to iterators, Introduction to Visual C#, Working with Visual C#, creating console applications with Visual C#., Windows form: creating window application , controls, events, XML documentation, Basic introduction to Web forms ADO .NET: Relational Database, Data set Object, Data Adapter, Command and connection, Data View, Working with managed provider, using the Generic provider, Data binding, Modeling table relationship, updating data, Transaction, Dataset updates, Concurrency.

Reference Books:

1. BL Jones (2002). SAMS Teach Yourself C# in 21 Days, SAMS.
2. J Shap & J Jagger (2003). Microsoft Visual C# .NET 2003, Microsoft Press.
3. Tom Archer and Andrew Whitechapel, Inside C#, 2nd Ed., Microsoft Press.
4. Harvey M. Deitel, C# For Experienced Programmers, Prentice Hall.

BCA603

Elective III Data Mining Techniques

Course Objective

Objective is to introduce the basic concepts of Data Warehouse and Data Mining techniques and discover interesting patterns, analyse supervised and unsupervised models and estimate the accuracy of the algorithms.

Course Outcome

- Process raw data to make it suitable for various data mining algorithms.
- Discover and measure interesting patterns from different kinds of databases.
- Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data.

MODULE I: Introduction - What is Data mining , Data mining - important Data mining - various kind of data - Data mining Functionalities – Various kinds of Patterns Pattern Interesting Classification of Data mining Systems Data mining Task Primitives Integration of Data Mining System Major issues in Data Mining

MODULE II: Data Processing - Process the Data Descriptive Data Summarization – Measuring Central Tendency Dispersion of Data Graphic Displays of –Basic Descriptive Data Summaries Data Cleaning Data Integration and Transformation data Reduction

MODULE III: Data Warehouse OLAP Technology An overview - Data Warehouse Multidimensional Data Model Data Warehouse Architecture Data Warehouse Implementation

MODULE IV: Mining – Frequent Patterns Associations Correlations - Basic Concepts Road Map Efficient Scalable Frequent Itemset Mining methods Mining – Various Kinds of Association rules Applications Trends - Data mining Applications Data mining – System Products Research Prototype Additional Themes on Data Mining Social impact of Data mining Trends in Data mining

MODULE IV: Database/OLTP Systems, Fuzzy sets and Fuzzy logic, Information retrieval, DSS, Dimensional modeling, OLAP, Web search engines, Machine learning, Pattern Recognition, Basic Data mining task, Data mining issues and metrics, Data mining versus KDD, Basic classification, clustering and Association rule case study

Text Book :

1. Data Mining (Concepts and Techniques) Second Ed Author : Jiawei Han and Micheline Kamber Publishers : Morgan Kaufmann Publishers (An imprint of Elsevier)
2. Data Mining (Practical Machine Learning Tools and Techniques (II Edition) Author : Ian H. Witten & Eibe Frank Publishers : Morgan Kaufmann Publishers (An imprint of Elsevier]
3. Data Warehousing , Data mining & OLAP (Edition 2004) Author : Alex Benson, Stephen V. Smith Publishers : Tata McGraw – Hill
4. Data Mining (Next Generation Challenges and Future Directions) Author : Karguta, Joshi, Sivakumar & Yesha Publishers : Printice Hall of India (2007)

Elective III Electronics on Communication

Course Objective

Objective of this course is to provide information about major components of communication and devices used in computing world.

Course Outcome

Graduates get revision and additional knowledge about gates, addressing mode, micro operation and Input/output organization.

MODULE I: Overview of Computer Hardware, basic structure of computer, concept of Von Neumann, various functional blocks, data representation and codes, Number System and Codes: Decimal, Binary, Hexadecimal, Octal, BCD, ASCII, UNICODE, EBCDIC, Conversions, Complements (1's and 2's), Signed and Unsigned numbers, Addition and Subtraction, Multiplication, Digital Logic Families: RTL, DTL, TTL and ECL, MOS and CMOS, Comparison, Realization of basic gates, Fan In and Fan out, power dissipation and noise Immunity, propagation delay, tri state logic, Logic Gates and Boolean Algebra: Truth Tables, OR, AND, NOT, EXOR, Universal (NOR and NAND) Gates, Boolean algebra and Minimization of Boolean Functions, Karnaugh Map, DeMorgan's Theorems.

MODULE II: Addressing modes, types of addressing modes, different types of instructions, Instruction Cycle, Memory-Reference Instructions, Register reference instructions, Input - Output Instructions, Arithmetic and Logic Unit, Introduction to memory Unit, control unit and Instruction Set, Working with an ALU, Concepts of Machine level programming, Assembly level programming and High level programming, Design of Accumulator Logic Shift Unit, Concepts of subroutines and subroutine calls, use of stack for handling subroutine call

MODULE III: Central Processing Unit, Introduction and its basic structure, General Register Organization, Functional blocks, Fetch and Execution cycle, Instruction sequencing, Introduction to CPU design, Instruction interpretation and execution, Micro-operation and their RTL specification, Hardwired control CPU design, Micro programmed control CPU design, microinstructions and their encoding, Arithmetic and Logic Unit, circuit diagram for arithmetic operations, BCD adders and subtractors

MODULE IV: Memory and storage, Processor Vs memory speed, static and dynamic memory, High-speed memories, access time, read only memories, Memory Hierarchy, Main Memory, Cache memory, Associative memory, Interleaved memory, Virtual memory and Memory management hardware. Concepts of semiconductor memory, CPU-memory interaction, organization of memory MODULES, Cache memory and related mapping and replacement policies, Virtual memory, secondary storage memory, floppy disks, magnetic disks, paging

MODULE V: Input/output organization, Addressing I/O devices, data transfer and synchronization, interrupt handling, I/O channels and interfacing, I/O devices, printers, VDU, keyboard, mouse etc. Peripheral devices, Asynchronous, Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), I/O processor. Programmed controlled I/O transfer, Interrupt controlled I/O transfer, DMA controller

Text Book:

- Morris Mano- Computer System Architecture, Prentice Hall.

Reference Books:

1. William Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001.
2. Harry & Jordan, Computer Systems Design & Architecture, Addison Wesley, Delhi, 2000.
3. Malvino, "Digital Computer Electronics: An Introduction to microcomputers", McGraw Hill, 1993.
4. Michael J. Flynn, "Computer Architecture"
5. Sajjan G. Shiva, "Computer Design and Architecture"

BCA 604

Elective IV Cryptography

Course Objective

Enable the students to learn fundamental concepts of computer security and cryptography and utilize these techniques in computing systems.

Course outcome

Students will have knowledge and understanding of: Classical and modern encryption techniques, Confidentiality using symmetric encryption, Basics of number theory, Public key cryptosystems, Message authentication, E-Mail, IP and web security, System security, Intruders, Malicious software, Firewalls.

MODULE I: Security problems in computer networks – kinds of security breaches – security services – conventional encryption model – classical encryption techniques.

MODULE II: Block cipher – design principles – Data Encryption Standard (DES) – triple DES – International Data Encryption Algorithm (IDEA) – RC2, RC5 – Blowfish – CAST 128 – Confidentiality using conventional encryption.

MODULE III: Principle of public key cryptosystems – RSA Algorithm – Elliptic curve cryptography – message authentication and Hash function – MD5 message digest Algorithm – Secure Hash Algorithm (SHA-1).

MODULE IV: Digital signatures and Authentication protocols – Kerberos – X.509 directory Authentication service – E-mail security – Pretty Good privacy, S/MIME – IP Security – Web security.

MODULE V: Intruders – Intrusion techniques – Intrusion detection – viruses and related threats – worms – Firewalls.

Text Book:

1. William Stallings, “Cryptography and Network Security: Principles and practice”, Pearson Education Inc., 1999.
2. Baxer, “Networking Security”, McGraw Hill, 1996.
3. Derek Atkins, “Internet Security”, Techmedia, 1998.
4. Simonds, “Network Security”, McGraw Hill, 1998.

Elective IV Cloud computing

Course Objective

The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including IaaS, PaaS, SaaS, and developing cloud based software applications on top of cloud platforms.

Course Outcome

- Understanding the key dimensions of the challenge of Cloud Computing
- Assessment of the economics, financial, and technological implications for selecting cloud computing for own organization
- Assessing the financial, technological, and organizational capacity of employer’s for actively initiating and installing cloud-based applications.
- Assessment of own organizations’ needs for capacity building and training in cloud computing-related IT areas

MODULE I: Cloud Computing Basics: Cloud Computing Overview-Applications-Intranets and the Cloud-First Movers in the Cloud. Your Organization and Cloud Computing: When you can use cloud computing - Benefits-Limitations-Security Concerns. The Business Case for Going to the Cloud: Cloud Computing Services – How those applications help your business.

MODULE II: Hardware and Infrastructure: Clients-Security-Network-Services. Accessing the Cloud : Platforms-Web Applications-Web APIs-Web Browsers.

MODULE III: Cloud Storage: Overview-Cloud Storage Providers. Standards: Application-Client-Infrastructure-Service

MODULE IV: Software as a Service: Overview-Driving Forces-Company Offerings-Industries. Software plus Services: Overview-Mobile Device Integration-Providers-Microsoft Online Developing Applications:

Google-Microsoft-Intuit QuickBase-Cast Iron Cloud-Bungee Connect- Development- Troubleshooting- Application Management.

MODULE V: Migrating to the Cloud: Cloud Services for Individuals- Cloud Services Aimed at the Mid Market – Enterprise – Class Cloud Offerings-Migration. Best Practices and the Future of Cloud Computing: Analyze your Service-Best Practices-How Cloud Computing Might Evolve.

Reference Books:

Cloud Computing by A Practical Approach by Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw-Hill Education Private Limited, New Delhi,2010 Edition, Fifth Reprint 2011.

MSIT/BCA/604	Subjects	Project Work	Viva	Internal Assessment	Total
Max. marks	System Development	200	50	100	350
Min. marks	project (System Design and Implementation)	100	25	50	175

- Synopsis of a project must be given within 10 days of starting the project.
- Regular reporting of project progress
- Hard binded copy as well as soft copy of project work must be submitted

MCA301
Programming in Core JAVA

Course Objectives:

- ☐ programming in the Java programming language.
- knowledge of object-oriented paradigm in the Java programming language.
- the use of Java in a variety of technologies and on different platforms.

Course Outcomes:

1. knowledge of the structure and model of the Java programming language, (knowledge)
2. use the Java programming language for various programming technologies (understanding)
3. develop software in the Java programming language, (application)
4. evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
5. propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
6. choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)

MODULE I: Introduction to java programming An overview of Java: Object Oriented Programming, History of java, Features of Java, Java Virtual Machine, Java Environment: Java Development Kit, Java Standard Library, introduction to java.lang package, Data Types, Variables: Declaring a variable, Dynamic Initialization, The scope and life time of variable, Type conversion and Casting: Narrowing and Widening Conversions, Numeric Promotions, Type Conversion Contexts; Operators: Arithmetic Operators, Relational Operators, Logical Operators, Bit wise Operators, Conditional Operators, new operator, [] and instance of operator. Control Statements: Java's Selection statement, Iteration Statement, Jump Statement, Array: Declaring Array variables, constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays.

MODULE II: Define the Class and interface -Introducing Classes: Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining Methods, method overloading, Using objects as parameter, Constructor, Garbage collection and it's algorithms, finalize () method, System.gc() and Runtime.gc(). Inheritance: Inheritance basic, method overloading, object reference, this and super keyword, Chaining constructor using this, use of super, Member accessibility modifier: public, protected, private and default accessibility of member. Package: Define package, CLASSPATH, importing package, Abstract class and abstract methods, Interface: Define an interface, Abstract class Vs Interface, implementing interface, extending interface, variable in interface, Overview of nested class: Top level nested class and interface, Non static inner class, Local class, Anonymous class.

MODULE III: Exception handling and Multithreading -Exception Handling: Exception Hierarchy, Exception types, Exceptions vs Error Uncaught Exception, Using try and catch, multiple catch, nested try block, throw, and throws, finally. Multithreading: creating Thread, Using Thread Class and Implementing Runnable Interface, Difference between Thread class and Runnable Interface, Thread priority, synchronization, Thread Scheduler, Running & yielding, sleeping and waking up, waiting and notifying, suspend and resume, miscellaneous method in thread class.

MODULE- IV : Input output, Networking and Fundamental class of java Object class, String class, StringBuffer class, Wrapper class, Math class, Collection: Collection interface, List interface, Set interface sorted interface, Array List class, Linked List class, Tree Set, Comparator, Vector, Stack. Input output classes and interface: File class, Reader class, Writer class, InputStream class, OutputStream class, Random Access File class, various ways for reading from and writing into a file, Object Serialization. Networking: Socket overview, Client/Server, Proxy Server, Network class and interface, TCP/IP client socket, TCP/IP Server socket, URL Connection, Datagrams, Datagram Packets.

MODULE V: GUI programming using SWING- Applet: Applet and Application program, Difference between an Applet and a standard program, Creating Applets, Applet Life Cycle, Applet and Thread, Supplying Applet parameter, Using Images and Sound in Applets, JAR files, Applet Security. Introducing the AWT and SWING: Overview of the java.awt, javax.swing package, Component and Containers: Component, Container, JPanel, JApplet, Window, JFrame, and JDialog classes. Working with Graphics, Working with Fonts, Working with Colors, GUI Control Components: Button, Canvas, Checkbox and Checkbox Group, Choice, JList, JLabel, Scrollbar, JTextField and JTextArea, JFrame, JMenuBar, JMenu and JMenuItem. Layout Management: Layout Management Policies, Flow Layout, Grid Layout, Border Layout, Card Layout, Grid Bag Layout, Customized Layout. Event Handling: Overview of Event Handling, Event Hierarchy, Event Delegation Model, Event Listeners, Event Adapter classes, Low Level Event Processing.

Recommended Books:

- The Complete Reference J2SE - Herbert Schildt, Publisher- TMH
- A Programmer Guide to Java - Khlid A. Mughal, R.W. Rasmussen. Publisher- Addison Wesley
- Introduction to HTML by - Kamlesh N. Agarwala, O.P.Vyas, P A. Agarwala. (KitabMahal Publications).
- Web Enabled Commercial Application Java 2 - Ivan Bayross Publisher- B.P.B.

MCA302 Web Designing and Scripting Language

Course Objectives:

On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies. Students will gain the skills and project - based experience needed for entry into web application and development careers.

Course Outcomes:

- Students are able to develop a dynamic webpage by the use of java script and DHTML.
- Students will be able to write a well formed / valid XML document.
- Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.
- Students will be able to write a server side java application called Servlet to catch form data sent from client, process it and store it on database.
- Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database.

MODULE I: Introduction: The World Wide Web (WWW), URL, Web Server, Communicating with the web server, concept of Client and Server Side, Web application development: Static & Dynamic web pages, Hypertext Markup Language, HTML History, STRUCTURAL ELEMENTS OF HTML DOCUMENTS: Header tags, body tags, Titles, HTML Tags for: Page background, Heading tags H1...H6, Paragraph <P>, Font, Rotating messages(Marquee), Line Break
, Section Separator <HR>, Different type of Lists: Numbered list, Non-Numbered lists, Definition lists. FORMATTING HTML DOCUMENTS: Physical Styles (Bold, Italic, Under Line), MANAGING IMAGES IN HTML: Image format (quality, size, type), TABLES IN HTML DOCUMENTS: Tags used in table definition, Tags used for border thickness, Tags used for cell spacing, Tags used for table size, Dividing tables with lines, Dividing lines with cells, Cell types: Titles cells, Data Cells. Concept of Hyperlink in HTML Documents: Links with images and buttons. MULTIMEDIA: Audio files and acceptable formats(AIFF, AU, MIDI, WAVE), Inserting audio files, Video files and acceptable formats(MPEG, Quick Time, Video for Windows), Inserting video files, Screen control attributes(WIDTH, HEIGHT, ALIGN). MANAGING FORMS: Interactive forms, Creating data entry forms, Concept of Frames

MODULE II: CSS in a Nutshell, the Benefits of CSS ,How CSS Works ,Rule Syntax ,Adding Styles to a Document ,Key Concepts ,Specifying Values, Browser Support , Type (Element) Selector - Contextual Selectors, Class and ID Selectors, Attribute Selectors, Font Family ,Font Size ,Other Font Settings ,Text Transformation (Capitalization) Text Decoration, Line Height, Text Alignment Properties, Text Spacing, Text Direction, Margins, Borders, Padding, Foreground Color, Background Color, Background Images, The Essence of Tables, Styling Tables, Borders, Table Layout (Width and Height), Table Display Values, Styling Background, Styling Lists, CSS Box Model.

MODULE III: What is Java Script, What can't you do with JavaScript? Java "vs" JavaScript, The hierarchy of JavaScript Objects, Window Object, document Object, Outputting Text with JavaScript, Using Arrays to Refer to Forms, Setting the bgColor & fgColor Properties, location Object, history Object, history and location Objects Example. Navigator properties, Data Type, parseInt(), parseFloat(), Variable, Variable Concatenation Example, Expression and operators, Example using the conditional operator, JavaScript Object, String Object, JavaScript String Manipulations Example, HTML string methods, Math Object, Using PI and Sqrt, Calculating the Square or Square Root, Date Object, Date object Example, JavaScript Built – in Functions, Three Types of Dialog Boxes in JavaScript.

MODULE IV: Event handler, Incorporating JavaScript into your HTML pages, Method1 : <Script> tag, Method2: Placing JavaScript within, HTML tags, Modularizing, Event Handlers, Attributes for the <SCRIPT> tag, Hiding scripts from other browsers, Java Scripting Commenting, Java Script and the HTML layout the concept of Program Control, Introduction to if – else Branching, while Loop : more about while loops, for loops : Calculating the sum of the digits, Nested for loops, Multiplication Table (more Nested for loops), Functions : with no parameters, with parameters- passing arguments, this keyword, returning values "multiple" returns, Variable Scope, Local – vs – Global Variables, Functions and their location within a document, Functions at work, Recursive Functions, The Document Object Model: What Does VBScript Manipulate, History and Background of the DOM, Properties, Methods, Events and Collections, Internet Explorer 5.x DOM, Event Handlers: Top-Down vs. Event-Driven Programming, Mouse Events, Keyboard Events, Validation and Error Handling.

MODULE V: PHP-Introduction to PHP, History, Web Browser, Web Server, Xampp, Installation and Configuration files, Syntax, Operators, Variables, Constants, Control Structure, Language construct and functions, Function – Syntax, Arguments, Variables, References, Returns and Variable Scope, Arrays-Enumerated Arrays, Associative array, array iteration, Multi-dimensional array, Array function and SPL, Date and Time functions, OOP's – Instantiation, Modifiers, Inheritance, Interfaces, Exceptions, Static Methods and Properties, Auto load, Reflection, Type Hinting and Class Constance, String and Patterns- Quoting, Matching, Extracting, Searching, Replacing and Formatting, Web Features- Sessions, Forms, GET and POST data, Cookies, HTTP Headers. Advance PHP technologies: Ajax Basics, Sending data to PHP with Ajax, Prototype-Utility functions, Ajax object and Form Object, Smarty- variables, Variable Modifiers, Built-in Functions, custom functions, Config files, Joomla, CakePHP - MVC Overview, Naming Conversions, Model, V\view, Controller, Helpers, Scaffolding an Data Validation, Introduction to Web Services.

Reference Books:

- Web Redesign: Workflow that Works
- HTML & XHTML: The Complete Reference Guide, 5th Edition
- The Non-Designer's Web Book, 3rd Edition
- VBScript Concepts and Techniques
- 'The Unfair Advantage Book on Winning the Search Engine Wars', An e-Book from Planet Ocean Communications
- Web Design in a Nutshell, Second Edition by Jennifer Niederst Robbins, Second Edition September 2001
- Learning Web Design: HTML, Graphics, and Animation A Beginner's Guide to HTML, Graphics, and Beyond by Jennifer Niederst Robbins PHP:
- The Complete Reference, By- Steven Holzner

MCA303

Elective I

- Advanced DBMS
- Principle of Communication Systems

Elective I

Advance DBMS

Course Objectives:

On completion of this course, a student will be familiar with fundamental knowledge of, and practical experience with, database concepts. Includes study of information concepts and the realization of those concepts using the relational data model. Practical experience gained designing and constructing data models and using SQL to interface to both multi-user DBMS packages and to desktop DBMS packages.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

1. Differentiate database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit.
2. Define the terminology, features, classifications, and characteristics embodied in database systems.
3. Analyze an information storage problem and derive an information model expressed in the form of an entity relation diagram and other optional analysis forms, such as a data dictionary.
4. Demonstrate an understanding of the relational data model.
5. Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.
6. Formulate, using relational algebra, solutions to a broad range of query problems.
7. Formulate, using SQL, solutions to a broad range of query and data update problems.
8. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
9. Use an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain, and query a database.
10. Use a desktop database package to create, populate, maintain, and query a database.
11. Demonstrate a rudimentary understanding of programmatic interfaces to a database and be able to use the basic functions of one such interface.

Module I- Purpose of Database Systems ; View of Data ; Database Languages ; Relational Databases ; Database Design ; Object based and semi structured databases ; Data Storage and Querying ; Transaction Management ; Database Architecture ; Database Users and Administrators ; Overall Structure ; History of Database Systems; overview of functional dependency and normalization

Module II- Query Processing ; Overview ; Measures of Query Cost ; Selection Operation ; Sorting ; Join Operation ; Other Operations ; Evaluation of Expressions, Query Optimization; Introduction; Transformation of Relational Expressions ; Catalog Information for Cost Estimation ; Statistical Information for Cost Estimation ; Cost based optimization ; Dynamic Programming for Choosing Evaluation Plans ; Materialized views

Module III- Indexing and Hashing; Basic Concepts; Ordered Indices ; B+ Tree Index Files; BTree Index Files; Static Hashing; Dynamic Hashing ; Comparison of Ordered Indexing and Hashing; Index Definition in SQL; Multiple Key Access

Module IV- Advance application development- Performance Tuning, Performance Benchmarks, Standardization, E-Commerce, Legacy Systems ,Advanced Data Types and New Applications- Temporal Data, Spatial and Geographic Database, Multimedia Databases, Mobility and Personal Databases

Module V-Advanced Transaction processing-Transaction-Processing Monitors, Transactional Workflows, High-Performance Transaction Systems- Main memory databases, Real-Time Transaction Systems; Long-Duration Transactions Transaction management in multidatabase systems

Suggested Books:

1. Data Base Management System - Alexis & Mathews [Vikas publication]
2. Database System - Henry Korth
3. Database System - Bipin Desai
4. Database System - C.J. Date
5. Oracle and Developer 2000 - Ivan Bayross

Text Books:

1. Fundamentals of Database Systems, Author: RamezElmeZElmasri and Shamkant 2. B.Navathe - Third Edition, ISBN : 981-4050-9, Publisher:Addition-Wesley.
3. H. F. Korth and A. Silberschatz: Database Systems & Concepts, McGrawHill Publications.

Reference Books:

1. R. Elmasri, S. B .Navathe: Fundamentals of Database Systems, Benjamin/Cummings Publishing Company.
2. Stefano Ceri, G. Pellagatti: Distributed Databases Principles & Systems, McGrawHill.

Elective I
Principle of Communication Systems

Course Objectives:

This course introduces students to: (i) the essential approaches, fundamental concepts and design issues in communication engineering. The course emphasizes the understanding of engineering principles. Mathematics is used only at a level that is absolutely necessary; (ii) basic concepts of modulation techniques including amplitude modulation (AM), frequency modulation (FM) and phase modulation (PM) that are widely used in analogue communication systems, and basic techniques for analyzing such systems in the time and frequency domains; (iii) basic concepts of a digital communication system including sampling theorem, pulse code modulation (PCM) and principles of digital data transmission, and basic techniques for analyzing such systems in the time and frequency domains.

Course Outcomes:

On successful completion of this course students will be able to:

- Analyse communication systems in both the time and frequency domains.
- Have familiarity with amplitude modulated and angle modulated communication systems and be able to analyse their performance in the presence of noise.
- Understand source coding, information theory and Shannon's theorem.
- Have familiarity with various digital modulation systems and their properties, including bandwidth, channel capacity, transmission over bandlimited channels, inter-symbol interference (ISI), demodulation methods, and error performance in the presence of noise.
- Have knowledge of error correcting codes, including block codes.
- Understand engineering fundamentals of photogeneration, photodetection, lightwave propagation, for optical communications.

Module-I

Introduction to communications systems, analog and digital communication systems, Applications of communication systems, Introduction to Wireless/mobile/radio Communications Systems: Evolution, Analog-to-Digital Conversion: Sampling theorem, Pulse-Amplitude Modulation, Channel bandwidth for PAM signal, Quantization of signals, Pulse-code modulation (PCM), The PCM system, Companding, PCM signals, Differential PCM.

Module-II

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power, distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation.

Module-III

Examples of Wireless Communication systems: paging system, cordless

systems, cellular systems, Comparison of common wireless communication systems, Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Block diagram of Transmitter and Receiver.

Module-IV

Digital Modulation Techniques: Binary Frequency-Shift Keying (BFSK), Binary Phase-Shift Keying (BPSK), Differential Phase-Shift Keying (DPSK), Quadrature Phase-Shift Keying (QPSK), Quadrature Amplitude Shift Keying (QASK), Spread spectrum modulation techniques: Pseudo-noise sequence, direct sequence spread spectrum (DS-SS), frequency hopped spread spectrum (FH-SS), performance of DS-SS, performance of FH-SS.

Module-V

Basic Principles of Satellite Communication: an overview of satellite system, satellite frequency bands for communication, Communications via satellite, characteristic features of communication satellites, Coverage area and satellite networks, Geometric distances, Communication time, and satellite visibility. Orbital Theory: Orbital mechanics, locating the satellite in the orbit w.r.t. earth look angle determination.

References

1. Jordan Edwards C. and Balmain Keith G., "Electromagnetic Waves and Radiating Systems", Prentice Hall (India).
2. T.S. Rappaport, "Wireless Communication-Principles and practice", Pearson.
3. Haykin S & Moher M., "Modern wireless communication", Pearson, 2005.

MCA304 Operations Research

Course Objectives:

Operations research (OR) has many applications in science, engineering, economics, and industry and thus the ability to solve OR problems is crucial for both researchers and practitioners. Being able to solve the real life problems and obtaining the right solution requires understanding and modeling the problem correctly and applying appropriate optimization tools and skills to solve the mathematical model. The goal of this course is to teach students about how to formulate, analyze, and solve mathematical models that represent real-world problems.

Course Outcomes:

- Formulate a real-world problem as a mathematical programming model
- Understand the theoretical workings of the simplex method for linear programming and perform iterations of it by hand
- Understand the relationship between a linear program and its dual, including strong duality and complementary slackness
- Perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change
- Solve specialized linear programming problems like the transportation and assignment problems
- Solve network models like the shortest path, minimum spanning tree, and maximum flow problems
- Understand the applications of, basic methods for, and challenges in integer programming
- Understand how to model and solve problems using dynamic programming
- Model a dynamic system as a queuing model and compute important performance measures
- Learn optimality conditions for single- and multiple-variable unconstrained and constrained non-linear optimization problems, and corresponding solution methodologies

Syllabus:

MODULE I: Introduction to Linear Programming - Construction of the LP Model - Graphical LP Solution; The Simplex Method : Standard LP Form and its basic solutions - the Simplex Algorithm, Artificial Starting Solution, Special Cases in simplex method application.

MODULE II: Duality Analysis: Definition of the Dual Problem - Relationship between the Optimal, Primal and Dual Solutions, Dual Simplex Method - Primal - Dual Computations -; Transportation Model and its variants: Definition of the Transportation Model, solution, test for optimality - the Assignment Model - Hungarian assignment method.

MODULE III: Network Models: Scope of Network Applications - Network Definitions, Minimal Spanning Tree Algorithm, Shortest Route Problem, CPM and PERT.

MODULE IV: Forecasting Models: Moving Average technique, Exponential smoothing, regression.

MODULE V: Decision Analysis: Decision - Making under certainty - Decision - Making under Risk, Decision under uncertainty; Simulation Modelling: Monte Carlo Simulation, Generation of Random Numbers, Method for Gathering Statistical observations.

Text Books /Reference Books:

- “Operations Research” - An Introduction by Hamdy A Taha, Prentice Hall India.
- “Operation Research”- Shaum Series.
- “Principles of Operation Research” Harvey M. Wagner, EEE.
- “Operation Research”, Frederick s.Hillier. CBS.

MCA305 Theory of Computation

Course Objectives:

Understanding the inherent capabilities and limitations of computers is a fundamental question in computer science.

To answer this question, this subject will define formal mathematical models of computation, and study their relationships with formal languages. Topics will consist of three central areas of the theory of computation: automata, computability, and complexity. Students will learn several formal mathematical models of computation along with their relationships with formal languages. In particular, they will learn regular languages and context free languages which are crucial to understand how compilers and programming languages are built. Also students will learn that not all problems are solvable by computers, and some problems do not admit efficient algorithms. Throughout this course, students will strengthen their rigorous mathematical reasoning skills.

Course Outcomes:

Upon successful completion of this course, the student should be able to:

1. Define languages by abstract, recursive definitions and by regular expressions.
2. Design a finite automaton to recognize a given regular language.
3. Transform a language into regular expression or finite automaton or transition graph.
4. Define deterministic and nondeterministic finite automata.
5. Prove properties of regular languages and classify them.
6. Determine decidability, finiteness and equivalence properties.
7. Define relationship between regular languages and context-free grammars.
8. Building a context-free grammar for pushdown automata.
9. Determine whether a given language is context-free language or not.
10. Prove properties of context-free languages.
11. Design Turing machine and Post machine for a given language.
12. Discuss the concept of computability.

MODULE I: Review of mathematical preliminaries, Relations, functions, set theory, predicate and propositional calculus, and principle of mathematical induction/strong mathematical induction.

MODULE II: Formal Languages, Phrase structured grammar and their classification, Chomsky hierarchy, closure properties of families of languages, regular grammar, properties of regular sets, finite automata NFA, DFA & 2DFA, FSM with output, Determinism and Non determinism, FA minimization and related theorems.

MODULE III: Context free grammar and their properties, derivation tree, simplifying CFG, unambiguifying CFG, CNF and GNF of CFG, push down automata, Two way PDA, relation of PDA with CFG, Determinism and Non determinism in PDA and related theorems.

MODULE IV: Concept of Linear Bounded Automata, context sensitive grammars and their equivalence; Unrestricted grammars and their equivalence with TM, determinism and non determinism in TM, TM as acceptor/generator/algorithms and related theorems, Multi tape, multi track TM, automata with two push down store and related theorems.

MODULE V: Introduction to Complexity theory Introduction to recursive function theory, Recursively enumerable sets, recursive sets, partial recursive sets, Russell’s paradox, Church’s hypothesis, post correspondence problem, undecidability and some non-computable problems.

Text Books:

- Hopcroft and Ullman: Introduction to automata theory, Languages & Computation, Narosha Publication house.
- Mishra & Chandrashekharan: Theory of Computer Science, Automata Languages & computation, 2nd Ed PHI, New Delhi.

Reference Books:

- LewishPapadimitra: Theory of Computation, Prentice hall of India, New Delhi
- Liu C.L: Elements of Discrete Mathematics, McGraw Hill.(3)
- Hopcroft, Rajeev Motwani and Ullman: Introduction to Automata theory, languages and computation.

Web programming and XML

Course Objectives:

On completion of this course, a student will be familiar with client server architecture and able to develop a web application using JSP/ servlet and XML technologies. Students will gain the skills and project - based experience needed for entry into web application and development careers.

Course Outcomes:

- Students are able to develop a dynamic webpage by the use of java script and XML.
- Students will be able to write a well formed / valid XML document.
- Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.
- Students will be able to write a server side java application called Servlet to catch form data sent from client, process it and store it on database.
- Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database.

MODULE –I : Web architecture and HTTP, History of World Wide Web, Hyper Text Transfer Protocol, SMTP, FTP, Hyper Text Markup Language, Introduction to XML, Benefit of XML over HTML, Web Architecture Using XML, Difference Between SGML, HTML and XML, Advantage and Future of XML, Advantage of XML, Heterogeneity, Flexibility, Information Modeling Static Vs Dynamic Modeling, Component of an XML Document, Identifying the Rule for Creating XML Document, Displaying XML, Transforming XML.

MODULE – II : Electronic Data Interchange and EAI, Scope of EDI in E – Commerce, Processing Instruction, Element Content, Attribute Comment Data Types Available in XML ,CDATA, PCDATA Well Formed and Valid Documents, XML Parser, Validating and Non Validating Parser, Element Attribute and Entity Declaration DTD's Documents type Declaration & Document type Definition Why DTD's Internal and External DTD's Building Our Own DTD, The SYSTEM and PUBLIC Keywords Using the URI and Inline DTD Together, Declaration Style + * and Qualifier Attribute Data Type, #IMPLIED, #FIXED and #REQUIRED.

MODULE- III : What is Namespaces, Namespace Declaration, use and benefit of it Issues With DTD's Advantages of XML schemas created using XSD Benefit of XSD over DTD's Support and Validation of XML using Version Parsers, Simple types including Atomic, Last and Union, Complex type including Element Restrictions min Occurs Max Occurs available constraining facets in the XSD Schema and their Use Import and Include What is XSLT, XSLT Syntax , Cascading Style Sheet CSS Vs XSLT, Benefit and Difference of XSLT over XSLT, Templates, Style sheet value – of, for Each, sort, Working of XSLT Processor Element, Attribute, Text, Select, Template, Calling Template, Conditional Processing Looping, XML Parse XSLT Template rule.

MODULE – IV : X Path Overview Major Features of X Path Tree Structure, Path Expression, X Path in java ,NET and PHP Tools for X Path, What is X Query, X Query Use Cases, Advantages of X Query, Structure of X Query Expression, for, let, Order by and Return Clause, X Query Built in Function Built-in Aggregate and String Functions, X Query in java.

MODULE – V :Implementation of DOM in MSXML Parser, Tree Structure of Document, XML DOM Object and Method, The Document Object in Script, Viewing and Adding Elements on XML tree Using XOM Handling Dom Events, Various types of DOM Nodes.

MCA402

Image processing

Course Objectives:

This course is an introduction to the fundamental concepts and techniques in basic digital image processing and their applications to solve real life problems. The topics covered include Digital Image Fundamentals, Image Transforms, Image Enhancement, Restoration and Compression, Morphological Image Processing, Nonlinear Image Processing, and Image Analysis. Application examples are also included.

Course Outcomes:

Upon completion of this course, students will be familiar with basic image processing techniques for solving real problems. Student will also have sufficient expertise in both the theory of two- dimensional signal processing and its wide range of applications, for example, image restoration, image compression, and image analysis.

MODULE I - INTRODUCTION

Fundamental Steps in Image Processing: Element of visual perception, a simple image model, sampling and quantization, some basic relationships between pixel, image geometry in 2D, image enhancement in the spatial domain. Digital image representation – image models, image types, image quality – colour models- Image acquisition – image sampling and quantization – pixel relationships – satellite image processing.

MODULE II – BASICS OF DIGITAL IMAGE PROCESSING

Fundamental steps in Digital Image Processing – grey level transformation – Histogram equalization – multi image operation – spatially dependant Transformation – templates and convolution – Transformation – Image enhancement techniques – image restoration.

MODULE III -MORPHOLOGICAL ALGORITHMS

Line detection, edge detection, gradient operator, edge linking and boundary detection, thresholding, region-oriented segmentation, representation schemes like chain codes, polygonal approximations, boundary segments, skeleton of a region, recognition and interpretation patterns and pattern classes, decision theoretic methods, introduction to neural network

MODULE IV - IMAGE COMPRESSION

Introduction – Principle of compression – Types of compression – Runlength Encoding – Huffman Coding – Modified Huffman Coding – Modified READ – LZW – Arithmetic Coding – JPEG – Other State-of-the-Art Image Compression – Image Compression Standard File Formats.

MODULE V - PATTERN RECOGNITION

Introduction, System Component, Complexity of Pattern Recognition, Object Representation, Feature Detection, Recognition Strategies – Classification, Matching, Feature Indexing. Verification – Template matching, Morphological Approach, Symbolic, Analogical Methods. Digital Image Processing Software – MATLAB, EASI/PACE, ERDAS Imagine.

REFERENCES BOOKS

1. Rafael C. Gonzalez, Richard.E, “Digital Image Processing (3rd Edition)” Woods Prentice Hall, 2007.
2. Anji Reddy.M, Hari Shankar.Y, “Textbook of Digital Image Processing”, BS Publications, 2006.
3. Robert Shcwebgerdt , “Remote sensing models & methods for image processing”, III edition, 2004.
4. William K. Pratt, Digital Image Processing: PIKS Inside (3rd ed.), John Wiley & Sons, Inc., 2001
5. M.A. Joshi, Digital Image Processing: An Algorithmic Approach, Prentice-Hall of India, 2006
6. B. Chandra and D.D. Majumder, Digital Image Processing and Analysis, Prentice-Hall of India, 2007

MCA403

Elective II

- Data ware housing and Data Mining
- MANET and Wireless Sensor Network

Data Warehousing and Data Mining

Course Objectives:

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. Examine the types of the data to be mined and apply preprocessing methods on raw data.
3. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

Course Outcomes:

Students who complete this course should be able to

1. Process raw data to make it suitable for various data mining algorithms.
2. Discover and measure interesting patterns from different kinds of databases.
3. Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data.

MODULE I: Data warehousing Definition, usage and trends, DBMS vs. data warehouse, Data arts, Metadata, Multidimensional data mode, Data cubes, Schemas for Multidimensional Database: stars, snowflakes and fact constellations.

MODULE II: Data warehouse process & architecture, OLTP vs. OLAP, ROLAP vs. MOLAP, types of OLAP, servers, 3-Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.

MODULE III: Data warehouse implementation, computation of data cubes, modelling OLAP data, OLAP queries manager, data warehouse back end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse. Data mining definition & task, KDD versus data mining, data mining techniques, tools and applications.

MODULE IV: Data mining query languages, data specification, specifying knowledge, hierarchy Specification, pattern presentation & visualization specification, data mining languages and standardization of data mining.

MODULE V: Data mining techniques: Association rules, Clustering techniques, Decision tree knowledge discovery through Neural Networks & Genetic Algorithm, Rough Sets, and Support, Vector Machines and Fuzzy techniques. Mining complex data objects, Spatial databases, Multimedia databases, Time series and Sequence data; mining Text Databases and mining Word Wide Web.

Text /Reference Books:

- Data Warehousing In the Real World; Sam Anahory& Dennis Murray; 1997, Pearson
- Data Mining- Concepts & Techniques; Jiawei Han &MichelineKamber- 2001, Morgan Kaufmann.
- Data Mining Techniques; ArunPujar; 2001, University Press; Hyderabad.
- Data Mining; Pieter Adriaans&DolfZantinge; 1997, Pearson,
- Data Warehousing, Data Mining and OLTP; Alex Berson, 1997, McGraw Hill.
- Data warehousing System; Mallach; 2000, McGraw Hill.
- Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
- Developing the Data Warehouses; W.H Ionhman,C.Klelly, John Wiley & Sons.
- Managing the Data Warehouses; W.H.Inman, C.L.Gassey, John Wiley & Sons.

Elective II

Mobile Ad hoc Network (MANET) and Wireless Sensor Networks (WSNs)

Course Objectives:

This course covers major aspects of ad hoc and sensor networking, from design through performance issues to application requirements. It starts with the design issues and challenges associated with implementations of ad hoc and sensor network applications. This includes mobility, disconnections, and battery power consumption. The course provides a detailed treatment of proactive, reactive, and hybrid routing protocols in mobile wireless networks. It also covers the IEEE 802.11 Wireless LAN and Bluetooth standards and discusses their characteristics and operations. About half of the course time is spent on wireless sensor networks (architecture, design, protocols, and applications). Through a project, the course gives students hands-on experience in designing a mobile ad hoc network using the NS2 network simulator.

Course Outcomes:

- Student has an understanding of the principles of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure based networks.
- Student have an understanding of the principles and characteristics of wireless sensor networks (WSNs).
- Student understand how proactive protocols function and their implications on data transmission delay and bandwidth consumption.

- Student understands how reactive routing protocols function and their implications on data transmission delay and bandwidth consumption.
- Student understands how proactive routing protocols function and their implications on data transmission delay and bandwidth consumption.
- Student understand how reactive routing protocols function and their implications on data transmission delay and bandwidth consumption.
- Student are familiar with the mechanisms for implementing security and trust mechanisms in MANETs and WSNs.
- Student have acquired skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations or programming of PDAs.

Module - I

Type of Networks: Infrastructure-based and Infrastructure-less, Introduction to Wireless Communication, The Electro Magnetic Spectrum, Radio Waves & its Propagation, Radio Portion of the Electromagnetic Spectrum, Spread Spectrum: Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS), Chirp Spread Spectrum, Narrowband/Single Frequency Radio and Wideband, Infrared, Bands in the Infrared, Application of Infrared in Communications, Microwave, Area of Application, Microwave Frequency Range & Bands.

Module - II

Wireless LAN, its Architecture, Types of Wireless LANs, Wireless LAN Standards: IEEE 802.11, European Telecommunications Standards Institute (ETSI), HiperLAN, Introduction to Wireless Local Loop (WLL), Wireless Local Loop (WLL) Standards: GSM, CDMA, TDMA, UMTS, Personal Handy-phone System (PHS), WiMAX or IEEE 802.16, Wireless Broadband Access Technology, Wireless PANs (Personal Area Networks), IrDA, Bluetooth, UWB, and ZigBee.

Module - III

Introduction to Mobile Ad hoc Network (MANET), Types of MANET, Applications, Medium Access Control, Routing protocols for MANET, Categorization of Routing Protocols for MANET, QoS in term of MANET, Classification of Attacks on MANETs.

Module - IV

Wireless sensor nodes and existing hardware, Operating systems for wireless sensor nodes, Node deployment options in WSNs, Topologies used for WSNs, Architectures for WSNs, WSNs lifecycle, Resource constraint nature of WSNs, Applications of WSNs, Existing standards for WSNs, Existing experimental tools for WSNs, Usability & reliability of experimental tools, Routing challenges & protocol design issues in WSNs, Existing protocols for WSNs, Protocol classifications for WSNs, Protocol evaluation factors, Theoretical aspects of major energy efficient protocols, Security issues in WSNs.

Module - V

Case Studies: Protocol work and Simulation in Linux Platform, Simulators: NS2, Mannasim Description. Performance Comparison of MANET & WSN Protocols under Specific Scenario conditions.

Reference

- William Stallings, “Wireless Communications & Networks”, Second Edition, ISBN: 0-13-191835-4.
 - Jochen Schiller, “Mobile Communications”, Addison-Wesley, Chapter-4,7,9,10,11, Second Edition, 2004.
 - A.K. Dwivedi, O.P. Vyas, “An Investigation on Protocols for Wireless Sensor Networks”, Chapter No.: 11, pp. 285-329, Book: Wireless Sensor Networks: Current Status and Future Trends, CRC Press, Taylor & Francis Group, USA. ISBN: 9781466506060.
 - A.K. Dwivedi, O.P. Vyas, “Wireless Sensor Networks: At a Glance”, Chapter No.: 14, pp. 299-326, Book: Recent Advances in Wireless Communications and Networks, InTech, Austria. ISBN: 978-953-307-274-6. DOI: 10.5772/19005
- <<http://www.intechopen.com/books/recent-advances-in-wireless-communications-and-networks/wireless-sensor-network-at-a-glance>>

MCA404
Summer Internship

MCA405

Artificial Intelligence

Course Objectives:

The course is designed to introduce both – (1) The traditional approach to machine learning using symbolic representations & manipulations, i.e., knowledge representations and problem solving techniques. (2) Techniques and application of machine learning techniques to data mining.

Course Outcomes:

Upon completion of this course,

- students will be familiar with several powerful search techniques for automatically solving complex problems.
- Student will also have sufficient expertise in both the theory of machine learning and its application to data mining, so as to use these powerful techniques in a wide range of industrial contexts, for example, bioinformatics, electronic commerce, and finance.

MODULE I: Introduction to AI: AI problems, Underlying assumptions, What is an AI technique? Criteria for success, Problem spaces, Search, State space representation of several problems.

MODULE II: Heuristic Search Techniques: Generate and test, Hill climbing, Breadth first search Problem reduction, Constraint satisfaction, Means-ends analysis, Dependency directed backtracking.

MODULE III: Knowledge Representation Issues and Representation using Predicate Logic: Declarative Vs Procedural knowledge, representation and mappings, knowledge representation issues, predicate logic vocabulary, Representing simple facts in logic, Computable functions and predicates, Conversion of WFFs to clause form, Resolution, Matching-Unification algorithm.

MODULE IV: Representing Knowledge using Rules: Logic programming Forward Vs Backward reasoning, Matching-RETE matching algorithm, approximate matching. Symbolic reasoning under uncertainty- Introduction to non-monotonic reasoning. Logic for non-monotonic reasoning. Statistical reasoning-Certainty factors, Bayesian networks, Dempster- shafer theory, Fuzzy logic.

MODULE V: Knowledge Representation using Slot and Filler Structures: Frame problem semantic nets, Frames-property inheritance, multiple Inheritance tangled hierarchies, CD representation and Scripts. PROLOG: Facts, Rules, Control Predicates, Recursion in PROLOG,

Text Books / References Books:

- Artificial Intelligence - Elaine Rich & - Kevin Knight (TMH).
- Introduction to Turbo PROLOG Carl Towsrehd (BPB).
- Artificial Intelligence & Expert Systems Dan W.Patterson (PHI).

MCA501

JAVA Programming Enterprise JAVA

Course Objectives:

The objective is to equip the students with the advanced feature of contemporary java which would enable them to handle complex programs relating to managing data and processes over the network. The major objective of this course is to provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business. This course presents several advanced topics of the Java programming language, including Servlets, Object Serialization and Enterprise JavaBeans. In order to build robust client server applications you need to understand the basics of many of these topics.

Course Outcomes:

- Learn the basic concepts of Object-Oriented programming and how they are handled in Java.
- Covers techniques for better class construction
- Understand Exceptions. How and when they should be handled
- An overview of database access and details for managing information using the JDBC API

- Examines the use of Object Serialization
- Addresses how to use Remote Method Invocation
- A general overview of Reflection and its uses
- Will be introduced to Java security
- Learn how to use Servlet and JSP and XML with JSP
- Be able to create and use custom JSP tags.
- A presentation of Enterprise JavaBeans and how to use it
- Identify advanced concepts of java programming with database connectivity.
- Design and develop platform independent applications using a variety of component based frameworks
- Able to implement the concepts of Hibernate, XML & EJB for building enterprise applications.

MODULE I : Java Database Connectivity: JDBC architecture; Drivers, JDBC-ODBC bridge, native API partly java driver, Net Protocol all Java driver, Native protocol all Java driver; Connecting to Database; statements; Multiple result sets; Large data types; Handling Errors; SQL warning; Metadata, database meta data, result set meta data; Transactions; Stored procedure; Batch updates; Binary large objects; Character large objects.

MODULE II : Remote Method Innovation: RMI architecture; RMI Object services; Naming/registry service, object activation service, distributed garbage collection; Defining Remote objects; Key RMI classes for remote object implementations; Stubs and skeletons; Accessing remote object as a client; Remote method arguments and return values; Factory classes; Dynamically loaded classes; Configuring clients and servers for remote class loading; Loading class from Applets; Remote object activation, persistent remote references; Defining an activatable remote object, activatable class, implementing an activatable object, registering activatable objects, passing data with the Marshalled object; Activation groups, registering activation groups, assigning activatable objects to groups; Activation daemon, dual personality.

MODULE III : Java Servlets: Life cycle; HTTP Servlets, forms and interaction; POST, HEAD and other requests; Servlet responses; Servlet requests; Error handling, status codes; Security; Servlet chaining; Custom Servlet Initialization; Thread safety; Server side includes; Cookies; Session tracking; Http session binding listener; session contexts; Databases and non-html content; Request dispatching; Shared attributes; Resource abstraction.

MODULE IV : Java Naming and Directory Interface: JNDI Architecture; Context; Initial context class; Objects in a context; Naming shell application; Command Interface, Loading initial context; Running shell; Listing children of a context; Browsing a naming system; Listing binding of a context; Creating and destroying context; Binding objects; Accessing directory services; X500 directories; Dir context interface; Attributes and attribute interface; Modifying directory entities; Creating directory entities; Searching and search criteria; Search results; search controls; search command

MODULE V : Enterprise Java Beans: Roles of EJB; EJB Client; Object; Container; Transaction Management; Making EJB server aware of database transactions; Transaction isolation levels; EJB object implementation; Home and remote interface; Bean Implementation; Implementing Session Beans; Stateless versus stateful session beans; Optional transaction support; Implementing entity beans; Primary keys; Finder method; Persistent profile bean; Entity Context; life cycle, handles; Container managed persistence; Complex data structures; Deploying an EJB object; Container managed data mapping; Access control deployment attributes; Generating container class and deployment descriptor; Packaging EJB; Finding home interfaces through JNDI; Creating and finding beans; Client side transactions; Changes in EJB 1.1 specification.

Text/Reference Books:

- Java Enterprise in a nutshell by David Flanagan and Jim Parley, O'Reilly Associates Inc.
- Complete Reference Java 2 Fifth Edition
- Mastering Enterprise Java Beans - Ed Romon 2nd Edition.

**MCA502
MS.Net Part-II**

Course Objectives:

This course is designed to provide the knowledge of Dot Net Frameworks along with C#. This course:

- Set up a programming environment for ASP.net programs.
- Configure an asp.net application.
- Creating ASP.Net applications using standard .net controls.
- Develop a data driven web application.
- Connecting to data sources and managing them.
- Maintain session and controls related information for user used in multi-user web applications
- Understand the fundamentals of developing modular application by using object oriented methodologies

- Use AJAX to create partial page updates that refresh only the parts of the Web page that have changed

Course Outcomes:

After completion of the course,

- the student will be able to use the features of Dot Net Framework along with the features of C#
- Successful students will be able to design web applications using ASP.NET
- Successful students will be able to use ASP.NET controls in web applications.
- Successful students will be able to debug and deploy ASP.NET web applications
- Successful students will be able to create database driven ASP.NET web applications and web services

MODULE I: MS.NET Framework: Introduction, The .NET Framework - an Overview, Framework Components, Framework Versions, Types of Applications which can be developed using MS.NET, MS.NET Base Class Library, MS.NET Namespaces, MSIL / Metadata and PE files. The Common Language Runtime (CLR), Managed Code, MS.NET Memory Management / Garbage Collection, Common Type System (CTS), Common Language Specification (CLS), Types of JIT Compilers, Security Manager

MODULE II:

Web Programming fundamentals, Understanding & Publishing Web Application, Introduction to ASP.NET Web Application, Advantages of IIS Applications, Creating web application in IIS, Converting File System application to IIS Application, Using Virtual Directory, Publishing ASP.NET Website, Culture specific formatting, ASP.NET Architecture: What is AppDomain, Life Cycle of ASP.NET Page, How Control Manages its State, What is EnableViewState, How Control raises events, Event handling in Web Forms, Writing Custom Classes in WebApplication, ASP.NET Introduction & Controls: ASP.NET Introduction, First ASP.NET Application, Auto Postback Property, Event Handler Parameters, Dynamically initializing Controls, IsPostBack property of Page class, ListControls, Comparison between HtmlControls and WebControls, Control Properties and Methods, FileUpload Control

MODULE III:

User Controls & Validation Controls: Overview of User Controls, Creating a User Control, Adding Properties to User Control, Adding Events to User Control, Using User Control in Web Form; Base Validator, Required Field Validator, Compare Validator, Range Validator, Regular Expression Validator, Custom Validator, Causes Validation Property, Grouping - Validation Group Property, Page.Validators and Page.IsValid, CSS & Themes: Work with CSS, Use Themes to Customize a Site, Name Skins within a Theme, Do server side Styles using ThemesAdd contents of a Theme and Skin, Apply themes and Profiles Master Pages: Introduction to MasterPage, ContentPlaceHolder and Content tags, Accessing controls of MasterPage in ContentPage, URL's in MasterPages, UniqueID and ClientID

MODULE IV:

ASP.NET State Management: Static Members, View State, Hidden Field in Form, Query String, HttpContext, Cookies-HttpCookie, Sessions-HttpSessionState, Application-HttpApplicationState, Summary of All Features, WebConfiguration File: Introduction to Configuration files, Page setting in web.config, Custom Errors, URL Re-Writing

MODULE V:

Database connectivity with web forms using MS SQL Server & DataBound Controls, Authentication & Authorization: What is Authentication and Authorization, Types of Authentication, Forms Authentication, Role based Authentication, Windows and Basic Authentication, What is ASP.NET Impersonation, Using location section in web.config

MCA503

Elective III

ADVANCED DATA WAREHOUSING AND DATA MINING

Course Objectives:

Students undergoing this course are expected to:

- Differentiate OnLine Transaction Processing and OnLine Analytical processing
- Learn Multidimensional schemas suitable for data warehousing
- Understand various data mining functionalities
- Inculcate knowledge on data mining query languages.
- Know in detail about data mining algorithms

Course Outcomes:

After undergoing the course,

- Students will be able to understand
- Design a data mart or data warehouse for any organization
- Develop skills to write queries using DMQL
- Extract knowledge using data mining techniques
- Adapt to new data mining tools.
- Explore recent trends in data mining such as web mining, spatial-temporal mining

MODULE I INTRODUCTION TO DATA MINING Introduction to Data Mining — Data Mining Tasks —Components of Data Mining Algorithms — Data Mining supporting Techniques — Major Issues in Data Mining —Measurement and Data — Data Preprocessing — Data sets

MODULE II OVERVIEW OF DATA MINING ALGORITHMS Overview of Data Mining Algorithms – Models and Patterns — Introduction — The Reductionist viewpoint on Data Mining Algorithms — Score function for Data Mining Algorithms- Introduction — Fundamentals of Modeling — Model Structures for Prediction —Models for probability Distributions and Density functions — The Curve of Dimensionality — Models for Structured Data — Scoring Patterns — Predictive versus Descriptive score functions — Scoring Models with Different Complexities — Evaluation of Models and Patterns — Robust Methods.

MODULE III CLASSIFICATIONS — Basic Concepts — Decision Tree induction — Bayes Classification Methods Rule Based Classification — Model Evaluation and Selection — Techniques to Improve Classification Accuracy — Classification: Advanced concepts — Bayesian Belief Networks- Classification by Back Propagation Support Vector Machine — Classification using frequent patterns.

MODULE IV CLUSTER ANALYSIS Cluster Analysis: Basic concepts and Methods — Cluster Analysis —Partitioning methods — Hierarchical methods — Density Based Methods — Grid Based Methods — Evaluation of Clustering — Advanced Cluster Analysis: Probabilistic model based clustering — Clustering High — Dimensional Data — Clustering Graph and Network Data — Clustering with Constraints.

MODULE V ASSOCIATION RULE MINING AND VISUALIZATION Association Rule Mining — Introduction — Large Item sets — Basic Algorithms — Parallel and Distributed Algorithms — Comparing Approaches — Incremental Rules — Advanced Association Rule Techniques — Measuring the Quality of Rules —Visualization of Multidimensional Data — Diagrams for Multidimensional visualization — Visual Data Mining —Data Mining Applications — Case Study: Tools such as DB Miner /WEKA/DTREG DM Tools

REFERENCES:

1. Jiawei Han, Micheline Kamber , Jian Pei, "Data Mining: Concepts and Techniques", Third Edition (The Morgan Kaufmann Series in Data Management Systems), 2012
2. David J. Hand, Heikki Mannila and Padhraic Smyth "Principles of Data Mining" (Adaptive Computation and Machine Learning), 2005
3. Margaret H Dunham, "Data Mining: Introductory and Advanced Topics", 2003 4. Soman, K. P., Diwakar Shyam and Ajay V. "Insight Into Data Mining: Theory And Practice"

Elective III Neural Network

Course Objectives:

This course aims at introducing the fundamental theory and concepts of computational intelligence methods, in particular neural networks, fuzzy systems, genetic algorithms and their applications in the area of machine intelligence. This can be summarized as:

1. To understand the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.
2. To understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic
3. To understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.

Course Outcomes:

At the end of the course, students should be able to understand and appreciate:

- The role of neural networks in engineering, artificial intelligence, and cognitive modelling.
- Feed-forward neural networks of increasing complexity, gradient descent learning and extensions, learning and generalization theory
- Hopfield model of content-addressable memory, Hopfield-Tank approach to optimisation, resistive networks for vision models, complex dynamical learning models.
- Generalization and function approximation

- Competitive learning, Self-organizing feature maps
- have an understanding of the concepts and techniques of neural networks through the study of the most important neural network models.
- have a knowledge of sufficient theoretical background to be able to reason about the behaviour of neural networks.
- be able to evaluate whether neural networks are appropriate to a particular application.
- be able to apply neural networks to particular applications, and to know what steps to take to improve performance.
- have knowledge of research literature on neural networks in one particular domain, and be able to put new work into context of that literature.

Module I

Introduction of Neural Network (ANN) , Motivation , Biological Neural Network , Single models , The artificial neuron model, Hopfield nets, Application of NN , Perception Network , Multilayer networks their variants and application , capacity of multilayer network.

Module II

Feedback network and feed forward networks their introduction, Back propagation Network (BPN); Introduction, aim, Learning Rule, Recurrent nets, Tree structure network, unsupervised learning, Hebbian learning

Module III

Competitive learning Feature mapping , self organizing maps, Adaptive Resonance Theory (ART); Introduction , ART fundamentals, basic architecture, ART1, ART2 , Conclusion recent trends and future directions

Module IV

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning – Machine Learning Approach to Knowledge Acquisition. Chromosome representation, encoding, decoding, Genetic operators: Selection, Crossover, Mutation, Elitism, Schema Theorem, EGA, Convergence theorem, real-coded GA, Ordered GA, Steady-state GA, Multi-objective evolutionary algorithms.

Module V

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

1. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Edn., 2003.
2. Simon Haykin - Neural Networks: A Comprehensive Foundation
3. George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”, Prentice Hall, 1995.

MCA 504
Industrial/Company/ Professional Training

MCA 505

Research paper publication in the field of specialization

MCA601

System Development project (System Design and Implementation)

MSIT/MCA/601	Subjects	Project Work	Viva	Internal Assessment	Total
Max. marks	System Development project (System Design and Implementation)	520	110	270	900
Min. marks		284		121	405

- The work done by the students should be worthy enough to prove the duration of computer applications project as six months
- The Certificate of the company must specify the duration of at least 4 months.
- The project should be based on application of technical knowledge for attempting live problems.
- Students undergone for project have to send the confirmation letter from the company within 15 days of joining. This letter will consist of information regarding company name, guide name, project title, project start date etc.
- Two progress reports should be sent by the project leader of the company to the department during 6 months of project work.
- The Student will have to deliver a very formal seminar in the form of power point presentation and 2 copies of project report are to be submitted.

