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NAME OF COURSE	DURATION	BATCH	BOS DATED	STATUS
BCA	3 YEARS	2022	04/07/2022	ORIGINAL

Bachelor of Computer Application (BCA)

Introduction

The main objective of this program is to inculcate among the students, the technical as well as the theoretical knowledge about the computers and its various applications in the different fields. This program is designed in such a way that the students can have a detailed knowledge of the subjects as well as the knowledge of the IT related applications. Throughout this program the students will go through the IT scenario, its scope, career and the essentials of the IT world. The students will be given chance to interact with the Corporate and other intellectuals in the field so as to enable them to grasp theoretical as well as technical knowledge from them and enhance their personality, skill and knowledge. The students will make use of the 24 hours internet facility and video conferencing to interact with the people in the IT field and share their knowledge and experience.

Program Objectives:

- To equip the students to meet the requirement of corporate world and Industry standard.
- To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications
- To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors

Program Outcome:

- Understand the concepts of key areas in computer science.
- Analyze and apply latest technologies to solve problems in the areas of computer applications.
- Analyze and synthesis computing systems through quantitative and qualitative techniques.
- Apply technical and professional skills to excel in business.
- Communicate effectively in both verbal and written form.
- Develop practical skills to provide solutions to industry, society and business.

1. Scope and Content

1.1. The regulations documented here are applicable to the B.C.A. programme offered by the university.
1.2. The applicability of the Regulations must be understood in the context of the given Scheme of study and the Syllabus of the programme.
1.3. The Regulations given here are in addition to the rules and regulations notified at the time of the admission.
1.4. 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 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:

- Core Subjects
- AECC (Ability Enhancement Compulsory Course)
- SEC (Skill Enhancement Course)
- DSE (Discipline Specific Electives) /Choice Based
- GE (Generic Electives)
- Lab Course

- Project Work

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 equipment /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/marked/industries, etc.

3. Eligibility for Admission and Mode of Selection

3.1. The minimum qualification required to be eligible for admission is a pass in the HSC or 10+2 examination of a Board of a State Government, or a course recognized as equivalent thereto buy the University, desirably with the relevant or related subjects as one of the subjects of study.

3.2. The method of selection for the course shall normally by means of a Personal interview. However, the admission might also by means of an entrance test.

4. Attendance and Examination

A student is eligible to appear for the term-end examinations, only if he/she 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 6 or 4 or 2 credits, each core bracket subject will carry 3 credits and practical courses will carry either 6 or 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 six-credit subject will comprises of an Internal Assessment component of30 marks and a Term-end Examination components of 70 marks.
- A four-credit subject will comprises 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.

5.3. Purpose of Internal Assessment

The Term-end Examination will be conducted as per the University regulations Sessional tests, assignment, mid-term examination, etc. will be conducted in each subject during the course of each semester, for the.

5.4. Assessment for Core Bracket Subjects

Depending on the participation and performance of students, the faculty of the Core Bracket subject will grad the student in term of a right-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+)
60 and above but below 70	8	Very Good (A)
55 and above but below 60	7	Good (B+)
50 and above but below 55	6	Above Average (B)
45 and above but below 50	5	Average (C)
40 and above but below 45	4	Pass(P)
Below 40	0	Fail (F)
	0	Absent (AB)

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

5.5. Assessment of Project Work

The project work will carry a total of 100 marks. Of this, 70% marks are for the external examination and 30% marks will be awarded for internal evaluation.

5.6. Eligibility to Appear for the Term-End Exam

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

6. Eligibility for Pass

6.1. A student shall be declared to have passed in a subject, if he/she secures at least 40% marks in the term-end examination and an aggregate of 40% including internal assessment.

6.2. 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.

6.3. A student shall be declared to have passed in Core Bracket subject, if he/she secures at least a pass grade.

6.4. 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 an aggregate marks of 75% and above in all the subjects;
- **First Class** Those securing an aggregate mark of less than 75%, but above 60% in all the subjects;
- **Second Class** Those securing an aggregate mark of less than 60%, but above 50% in all the subjects;
- **Pass** Those securing an aggregate mark of less than 50% 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 Bachelor Degree of B.C.A., upon fulfillment of the following criteria:

a) Must have passed all the subjects of the six semester with a minimum of 40% in each subject including Internal assessment and secured 45% in aggregate;
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 the complement 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 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 basic for disciplinary action but also is relevant to the evaluation of student's level of performance and progress.
- Where there has been violation of the basic ethos and principles of academic integrity and ethics, the Director/Board of Examiners/Course coordinator may use their discretion in terms of disciplinary action to be taken.

Academic dishonesty includes, but is not necessarily limited, to the following:

- Cheating or knowingly assisting another student in committing a act of cheating;
- Unauthorized possession of examination materials, destruction or hiding of relevant materials;
- Act of plagiarism;
- Unauthorized changing of marks or marking on examination records.

10.2. Attendance

a) Student are required to attend and participate in all scheduled class sessions, guest lecturer, 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/Programmer coordinator would determine whether the absences could be rectified or whether it is possible to satisfactorily 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 profession 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.

BACHELOR OF COMPUTER APPLICATION – BCA

SEMESTER –I

Subject Code	Subject	Credit 1 Cr= 1 hrs	L+T+P	Univ. Exam Marks	Int. Marks	Total Marks
CORE COURSES						
BCA101	PROGRAMMING IN C	4	3+1+0	70	30	100
BCA102	FUNDAMENTALS OF INFORMATION TECHNOLOGY	4	3+1+0	70	30	100
BCA103	DISCRETE MATHS	4	3+1+0	70	30	100
BCA104	BASIC ANALOG AND DIGITAL ELECTRONICS	4	3+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA105	ENVIRONMENTAL STUDIES	2	1+1+0	35	15	50

SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE (GENERIC ELECTIVES)						
BCA106	OFFICE AUTOMATION CERTIFICATION	4	2+0+2	70	30	100
LAB COURSES						
BCA107	PROGRAMMING IN C LAB	2	0+0+2	35	15	50
BCA108	FUNDAMENTALS OF INFORMATION TECHNOLOGY LAB	2	0+0+2	35	15	50
		26		455	195	650

BACHELOR OF COMPUTER APPLICATION – BCA

SEMESTER –II

Subject Code	Subject	Credit 1 Cr= 1 hrs.	L+T+P	Univ. Exam Marks	Int. Marks	Total 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	DATA COMMUNICATION AND NETWORKING	4	3+1+0	70	30	100
BCA204	OPERATING SYSTEM CONCEPTS	4	3+1+0	70	30	100

AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA205	COMMUNICATIVE ENGLISH	2	1+1+0	35	15	50
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
BCA206	DESKTOP PUBLISHING Certification	4	2+0+4	70	30	100
LAB COURSES						
BCA207	OBJECT ORIENTED PROGRAMMING - C++ LAB	2	0+0+2	35	15	50
BCA208	RELATIONAL DATA BASE MANAGEMENT SYSTEM LAB	2	0+0+2	35	15	50
		26		455	195	650

BACHELOR OF COMPUTER APPLICATION – BCA

SEMESTER –III

Subject Code	Subject	Credit 1 Cr= 1 hrs	L+T+P	Univ. Exam Marks	Int. Marks	Total Marks
CORE COURSES						
BCA301	DATA STRUCTURE USING C++	4	3+1+0	70	30	100
BCA302	PROGRAMMING IN CORE JAVA	4	3+1+0	70	30	100
BCA303	SOFTWARE ENGINEERING	4	3+1+0	70	30	100
BCA304	NUMERICAL ANALYSIS	4	3+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA305	ENTERPRENEURSHIP	2	1+1+0	35	15	50
SEC(SKILL ENHANCMENT COURSE)						

DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
LAB COURSES						
BCA307	ALGORITHM AND DATA STRUCTURE USING C++ LAB	2	0+0+2	35	15	50
BCA308	PROGRAMMING IN CORE JAVA LAB	2	0+0+2	35	15	50
		22		385	165	550

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SEMESTER –IV

Subject Code	Subject	Credit 1Cr= 1 hrs	L+T+P	Univ. Exam Marks	Int. Marks	Total Marks
CORE COURSES						
BCA401	JAVA FX AND ADVANCED PROGRAMMING IN JAVA	4	3+1+0	70	30	100
BCA402	WEB DESIGNING AND HOSTING	4	3+1+0	70	30	100
BCA403	COMPUTER SYSTEM ARCHITECTURE	4	3+1+0	70	30	100
BCA404	BIG DATA MANAGEMENT SYSTEM	4	3+1+0	70	30	100

AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
BCA405	MINI PROJECT	2	1+1+0	35	15	50
SEC(SKILL ENHANCMENT COURSE)						
DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
GE(GENERIC ELECTIVES)						
BCA406	CLIENT SERVER ARCHITECTURE IMPLEMENTATION AND NETWORK TROUBLE SHOOTING	4	2+0+2	70	30	100
LAB COURSES						
BCA407	JAVA FX AND ADVANCED PROGRAMMING IN JAVA LAB	2	0+0+2	35	15	50
BCA408	WEB DESIGNING AND HOSTING LAB	2	0+0+2	35	15	50
		26		455	195	650

BACHELOR OF COMPUTER APPLICATION – BCA

SEMESTER – V

Subject Code	Subject	Credit 1 Cr= 1 hrs	L+T+P	Univ. Exam Marks	Int. Marks	Total Marks
CORE COURSES						
BCA501	LINUX/UNIX PROGRAMMING	4	3+1+0	70	30	100
BCA502	INTRODUCTION TO MICROSOFT .NET AND C#	4	3+1+0	70	30	100
BCA503	GREEN COMPUTING	4	3+1+0	70	30	100
AECC (ABILITY ENHANCEMENT COMPULSORY COURSE)						
SEC(SKILL ENHANCMENT COURSE)						

DSE (DISCIPLINE SPECIFIC ELECTIVES) /CHOICE BASED						
BCA504	ELECTIVE I (GRAPH THEORY / OPERATION RESEARCH)	4	3+1+0	70	30	100
BCA505	ELECTIVE II (MANAGEMENT INFORMATION SYSTEM / INTERNET OF THINGS)	4	3+1+0	70	30	100
BCA506	INDUSTRIAL/COMPANY/PROFESSIONAL TRAINING	2	0+0+2	35	15	50
GE(GENERIC ELECTIVES)						
LAB COURSES						
BCA507	LINUX/UNIX PROGRAMMING LAB	2	0+0+2	35	15	50
BCA508	INTRODUTION TO MICROSOFT .NET AND C# LAB	2	0+0+2	35	15	50
		26		455	195	650

BACHELOR OF COMPUTER APPLICATION - BCA

SEMESTER - VI

Subject Code	Subject	Credit 1 Cr= 1 hrs	L+T+P	Univ. Exam Marks	Int. Marks	Total Marks
CORE COURSES						
BCA601	ASP .NET USING C#	4	3+1+0	70	30	100
BCA602	EXTENSIBLE MARKUP LANGUAGE	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 (DATA MINING TECHNIQUES / CRYPTOGRAPHY)	4	3+1+0	70	30	100
BCA604	ELECTIVE IV (INTERNET SECURITY / CLOUD COMPUTING)	4	3+1+0	70	30	100

BCA605	SYSTEM DEVELOPMENTPROJECT (SYSTEM DESIGNAND IMPLEMENTATION)	6	0+0+6	105	45	150
GE(GENERIC ELECTIVES)						
LAB COURSES						
BCA606	ASP .NET USING C# LAB	2	0+0+2	35	15	50
BCA607	EXTENSIBLE MARKUP LANGUAGE LAB	2	0+0+2	35	15	50
		26		455	195	650

BCA 101

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', Features of C, Structure of 'C' program, Compilation and Execution, Tokens: Keywords, Identifiers, Variables, Constants, Strings, Special Symbols. Literals Operators: Arithmetic, Relational, Assignment, Ternary, Logical, Conditional, Bitwise and Shift, Misc. Data types: Primitive, Derived, Enumeration,

Void. Comments, Static Keywords, Programming Errors. 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 Statements: Branching Statements: If, If else if, if else if, nested if, Looping Statements: Do-while, while loop, for loop, nested loop 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, #ifef and #indef, 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:

- Programming in C Yashwant Kenetkar
- Programming in 'C" Venugopal
- The C Programming Language Kernigham and Ritche [Prentice Hall]
- Application Programming in C Richard Johnson-baugh&MartinKalin
- The Spirit of C Macmillan International Editions, Mullish Cooper, Jaico Publishing House.

Reference Books:

- The art of C Programming Jones, Robin & Stewart, Narosa Publishing House.
- C Problem solving and Programming A. Kenneth, Prentice Hall International.
- C made easy H.Schildt, McGraw Hill Book Co.

BCA102

Fundamentals of Information Technology

Course Objective:

The objective of the course is to introduce the concepts of computer fundamental & their application s 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 Module : The Microprocessor, control Module, 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:

- Using IT - Williams- T M Hill
- Fundamental of computers - ChetanSrivastav
- 'O' level - V. K. Jain
- Fundamentals of Computers - V. Rajaraman Prentice-Hall India

BCA 103

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:

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

Reference Books:

- Discrete Mathematics - C.L.LiuT.M.Hill
- Graph Theory and its applications - Narsingh Dev.

BCA 104

BASIC ANALOGAND DIGITAL ELECTRONICS

Course Objective

The objective of this course is to introduce the organization of a computer and its principal components, viz, ALU, Control, Memory and Input/output. The course will also enable the student to understand the design components of a digital subsystem that required realizing various components such as ALU, Control, etc.

Course Outcome

- An ability to understand theory of Digital Design and Computer Organization to provide an insight of how basic computer components are specified.
- An ability to understand the functions of various hardware components and their building blocks.
- An ability to understand and appreciate Boolean algebraic expressions to digital design.
- An in depth understanding of sequential! Combinational circuits.

MODULE I:

Introduction to semiconductor devices, Intrinsic and extrinsic Semiconductors, conductivity, drift, diffusion, Diodes and transistors, Energy band diagram, characteristics of junction diodes, p-n junction diode, Bipolar transistors, Transistor currents, static characteristics, amplification action, classification and characteristics of amplifiers, biasing schemes, modes of operations, General idea about FET, OP-AMP.

MODULE II:

Electronic circuits – Half wave and Full wave rectifiers, full wave bridge rectifier, ripple factor, amplifiers, operational amplifier, oscillators, conditions for oscillation, filters, shunt capacitor filter, series inductor filter, voltage multipliers, silicon controlled rectifiers, properties of R-L-C circuits, inverters, regulators, Basic OP-AMP shunt regulator.

MODULE III:

Basic Digital building blocks – Introduction to Number system, binary number system and binary arithmetic, conversion from one number system to other, different codes used in computers, Boolean algebra, logic gates, flip flops, JK, RS, Master slave flip flops, truth table, An introduction to timing diagrams, Setup and hold times. Logic families - TTL, CMOS, TTL, ECL etc.

MODULE IV:

Combinational Circuits – Truth table, implementation of digital functions, half adder, full adder, parallel binary adder, substractor, half substractor and full substractor, encoder, decoder, multiplexer, de-multiplexer, Other basic building blocks.

MODULE V:

Sequential Circuit – Sequential logic elements, flip flops, registers, shift registers, ring counter, counters using flip flop, ripple and synchronous counters, up-down counters state diagrams and state machines.

Text Book:

- B.L. Theraja "Principles of Electronic devices and circuits", S. Chand.

Reference Books:

- Ryder J.D., "Electronics fundamentals and applications" Prentice Hall.
- Millman, J. and Halkias, C.C. "Integrated Electronics" McGraw Hill.
- Andrew Singmin, "Beginning Analog Electronics".
- Andrew Singmin, "Beginning Digital Electronics".

BCA105

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-sports of biodiversity. Threats to biodiversity: Conservation of biodiversity:

Reference Books:

- Agarwal K.C. 2001 Environmental Biology Nidi Publ. Ltd. Bikaner.
- BharuchaErach, the Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad 380 013, India, Email: mapin@icenet.net(R)
- Bruinner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB).
- Cuningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 200,

BCA 106
OFFICE AUTOMATION CERTIFICATION

BCA 107
PROGRAMMING IN C LAB

BCA 108
FUNDAMENTALS OF INFORMATION TCHNOLOGY LAB

BCA 201

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 ad 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:

- Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publications, 1994.

Reference Books:

- D. Ravichandran, "Programming with C++", TMH, 1996.
- BjarneStrautrup, "The C++ Programming Language", Addition- Wesley Publication Co., 1995.
- Object Oriented Programming in C++: Barkakati, Nabajoti (Prentice Hall of India) 1996
- D. Parasons, "Object Oriented Programming with C++", BPB Publication.

BCA 202

Relational database Management System

Course Objective

Students 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, Data base administrative.

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:

Data base model: its type, Object-Oriented and Extended Relational, Database Technology, Concepts for Object-Oriented Database, Object Database Standards, Languages and Design. Introduction to File organization, Organization of records in files, Data dictionary storage, ordered indices, B+ Tree, Static and Dynamic Hashing, Comparison of ordered indexing and Hashing.

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, rd, NF and BCNF, Multi-valued Dependency, 4 NF, Join Dependency, PJNF(5NF). Transaction management in database,

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; Procedures and Functions, Error Handling in PL/SQL; Cursors; Database Triggers;

Suggested Books:

- Data Base Management System - Alexis & Mathews [Vikas publication]
- Database System - Henry Korth
- Database System - Bipin Desai

Text Books:

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

Reference Books:

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

BCA 203

Data Communication and Networking

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. 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. Various Topologies, Transmission Mode, 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, the concept of ICMP, ARP, RARP.

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.

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:

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

Reference Books:

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

BCA 204

OPERATING SYSTEM CONCEPTS

Course objective

Graduates are 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 of operating system and Architecture, Goals & Structures of O.S, Basic functions, Interaction of O. S. & hardware architecture, System calls, Batch, multiprogramming. Multitasking, time sharing, parallel, distributed & real -time O.S.Process Management Process: Concept, Process states, Process control, Threads, Uni-processor Scheduling: Types of scheduling: Pre-emptive, Non-pre-emptive, Scheduling algorithms: FCFS, SJF, RR, Priority, Thread Scheduling, Real Time Scheduling. System calls like ps, fork, join, exec family, wait.

MODULE-II

Concurrency control: Concurrency: Principles of Concurrency, Mutual Exclusion: S/W approaches, H/W Support, Semaphores, pipes, Message Passing, signals, Monitors, Classical Problems of

Synchronization: Readers-Writers, Producer Consumer, and Dining Philosopher problem. Deadlock: Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, System calls like signal, kill.

MODULE-III

Memory Management: Memory Management requirements, Memory partitioning: Fixed and Variable Partitioning, Memory Allocation: Allocation Strategies (First Fit, Best Fit, and Worst Fit), Fragmentation, Swapping, and Paging. Segmentation, Demand paging Virtual Memory: Concepts, management of VM, Page Replacement Policies (FIFO, LRU, Optimal, Other Strategies), Thrashing. Inter Process Communication Basic Concepts of Concurrency, Cooperating process, Advantage of Cooperating process, Bounded- Buffer - Shared-Memory Solution, Inter-process Communication (IPC), Basic Concepts of Inter-process Communication and Synchronization.

MODULE-IV

I/O management & Disk scheduling: I/O Devices, Organization of I/O functions, Operating System Design issues, I/O Buffering, Disk Scheduling (FCFS, SCAN, C-SCAN, SSTF), RAID, Disk Cache. Multi-Processor Based and Virtualization Concepts. Virtual machines; supporting multiple operating systems simultaneously on a single hardware platform; running one 8 15 operating system on top of another. Reducing the software engineering effort of developing operating systems for new hardware architectures. True or pure virtualization. Para virtualization; optimizing performance of virtualization system; hypervisor call interface.

MODULE-V

Advanced Operating System, Basics of Network Operating System, Server Operating System and Real Time Operating System, File System.

Reference Books:

- Modern Operating Systems -By Andrew S. Tanenbaum (PHI)
- Operating Systems 5th Edition, William Stallings, Pearson Education India
- Operating System Concepts, 9th edition Peter B. Galvin, Greg Gagne, Abraham Silberschatz, John Wiley & Sons, Inc.

Web References:

http://www.cs.pdx.edu/~walpole/class/cs533/papers/RPC.pdf

http://www.cs.pdx.edu/~walpole/class/cs533/papers/lrpc.pdf

BCA 205

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 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:

a) A set of exercises in both oral and written communication.
b) Self- managed reading/ writing.
c) Audio and video presentations.
d) Use of print media for explanation of certain topics.

REFERENCE BOOKS

- Business Communication – K.K.Sinha.
- Effective Business communication – Herta.A.Murphy,HERBER.W.
- Effective Business Communication – AshaKaul.
- Business Correspondence and report writing – R.C. Sharma and Krishna Menon.
- Communication Skills – Rajendra Pal, 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

BCA 205

Desktop Publishing (Certification)

BCA 207

Object Oriented Programming in C++ LAB

BCA 208

Relational Database Management System

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 algorithms, Greedy method. Representation of array (single & multi-dimensional arrays), Address calculation and implementation using column & row major ordering.

MODULE II:

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

MODULE III:

Linked list, Concept of a Linked List, Singly linked list (Operations on list), Linear Single and Double lists, Linked stacks and queues, 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:

Graph, Definitions of vertex edge and Graph, Types of graphs directed / undirected, connected / disconnected, cyclic / acyclic, Representation of graphs: Adjacency matrix, linked list, Trees, Definitions of n-ary Tree, 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 (Preorder, Postorder and Inorder), Logical level of binary search tree, Recursive and non-recursive algorithms for traverse method, Insertion into and deletion from a BST and their implementation, Threaded tree,

MODULE V:

Searching and Sortings, 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.

Text Book:

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

Reference Books:

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

BCA 302

Programming in core Java

Course Objective

To impart the basic concepts of Java Programing 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, BDK 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:

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

References Books:

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

BCA 303

Requirements, Functional and Non-Functional Requirements, Software Requirements Specification (SRS), Feasibility Study, Requirements Elicitation Requirements Validation, Requirements Management.

MODULE: IV

Software Prototyping, Specifications, Rapid Prototyping Techniques, User Interface Prototyping, Analysis Modeling, Context Model, Data Modeling Concepts, Cardinality and Modality, Flow Oriented Diagram, Design Concepts, Principles & Methods, Data Dictionary, Information Hiding, Functional Independence, Design Process, Design Quality, Design Classes, Design Model, Software Architecture Data Design, Architectural Styles and Patterns, User Interface, Input design, End-user Considerations for Input Design, Output Design, Software Patterns,

MODULE: V

Software Testing Fundamentals, Characteristics and Goals of Software Testing, Types of Testing, White-box Testing, Module Testing, Basis Path Testing, Control Structure Testing, Black-box Testing, Gray-box Testing, Regression Testing, Object-Oriented Testing Methods, System Testing, Strategic Approach, Software Testing Strategy, Strategic Issues, Integration Testing, Validation and Verification Testing, Test Automation. Computer Aided Software Engineering (CASE), Case Work Benches, Integrating Case Environment, Reusability and Need of Reusability.

Text Books:

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

Reference Book

- Software Engineering – LanSommervillie, Pearson Education.

BCA 304

Numerical Analysis

Objective:

Numerical analysis is the area of mathematics and computer science that creates, analyzes, and implements algorithms for solving numerically the problems of continuous mathematics.

Outcomes:

This course provides an introduction to the basic concepts and techniques of numerical solution of algebraic equation, system of algebraic equation, numerical solution of differentiation, integration and their inter-relations and applications to computer science and engineering.

MODULE: I

NUMERICAL SOLUTIONS OF ALGEBRAIC, TRANSCENDENTAL AND SIMULTANEOUS LINEAR EQUATIONS Errors in numerical computation, Error type, Bisection Method, Regula–Falsi Method, Secant Method, Newton-Raphson Method, Direct Methods: Gauss Elimination, Crout's Triangularisation Method.

MODULE: II INTERPOLATION

Finite differences, Forward, Backward & Central Difference Interpolation, Lagrange's method and Newton's Divided Difference method,

MODULE: III NUMERICAL DIFFERENTIATION AND INTEGRATION

Derivatives using Forward, Backward and Central Difference methods, Derivatives using unequally spaced values, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Weddle's rule.

MODULE: IV NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

Numerical Solution of ODE using Picard's Method, Taylor's Series Method, Euler's Modified Method, Runge-Kutta Method of Fourth Order, Milne's Method.

MODULE: V NUMERICAL SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS

Classification of Second order equations, Elliptic Equations, Solution of Laplace equation, parabolic equations, Solution of Heat equation, hyperbolic equation, and Solution of Wave equation.

References

- P. Kandasamy, K. Thilagavathy, & K. Gunavathi, Numerical Methods, S. Chand Publisher.
- E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons Inc. Publisher.
- S. S. Sastry, Introductory methods of numerical analysis, PHI, Publisher.

BCA 305

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 commModuleies. 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 Progrmmes: 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. OpportModuley sensing via personal observation, vicarious experience, primary surveys and secondary data analysis. Role of business consultants/ mentors, entrepreneurship trainers, and, family-and commModuley networks in identifying business opportModuleies. 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

BCA 307
Algorithm and Data Structure Using C++ LAB

BCA 308
Computer Graphics LAB

BCA 401

JAVA FX AND ADVNACE PROGRAMMING IN JAVA

Course Objective

To impart the basic concepts of Java FX Programing and to develop understanding about working in advance Java for future aspects and development.

Course outcome

- Understands and learn java FX.
- Gets the knowledge of advance java and Server.

MODULE I:

Java FX, Features of Java FX, FX Architecture, FX API, Application Structure, Java FX: 2D shape, shape properties, Java FX: Line, Rectangle, Ellipse, Arc, Circle, Polygons, Qubic and Quad curve, FX color and gradient color. FX Text, FX Effect, FX Transformation, FX, Animation, FX, 3d Shape, FX Layout, FX UI, FX Chart, FX, CSS, Media, Event Handling.

MODULE II:

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, Forword/include/ send redirect, servlet chaining, deployment descriptor.

MODULE III:

Introduction to JSP, Basic JSP Syntax, Java Server Pages, JSP Vs Servlet, MVC Architecture, JSP Scripting Tags: Scriptlet, Expression, Declaration, JSP Implicit Objects: Request, Response, Config, Application, Session, PageContext, Page, JSP Directive Elements: Page, Include, Taglib , JSP Action Element: Forward, Include, Bean Class, Get & Set Property, JSP Exception.

MODULE IV:

Hibernate Introduction, ORM, Advantages of Hibernate, Hibernate Architecture, Hibernate using XML and Annotation, Hibernate Web Application and Generator classes, Log4j, Inheritance Mapping: Table Per Hierarchy (TPH), TPH using annotation, Table Per Concrete (TPC), TPC using Annotation, Table Per Subclass (TPS), PTS using Annotation, Hibernate Mapping: Collection Mapping, List, Bag, Set, MAP. TX, Management, HQL, Named Query, Hibernate Caching.

MODEL V:

Introduction of spring, Spring Modules, Spring Application, Dependency Injection, Constructor Injection, Spring AOP Concept, Spring MVC, MVC, Form Tag Library, Spring Boot Introduction, Spring Boot vs. Spring MVC.

Reference:

- Programming in java – E. Blaguswami
- Beginning Java programming – Wrox Series
- JAVA FX - Kishori Sharma
- Mastering in JAVA FX 10 – Sergev Grinev

BCA 402

Web Designing and Hosting

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

Introduction of HTML, HTML Editor, HTML basic, elements, Attributes, Headings, Paragraphs, Styles, Formatting, quatations, comments, colors, Links, images, tables, list, Block & inline, iframes, file paths, head, layouts, entities, symbols, HTML forms, form attributes, form elements, input types, input attributes, input form attributes. HTML canvas, SVG, HTML Media, Video, Audio, plug-ins, you tube, HTML doctype.

MODULE-II

Introduction of CSS, syntax, selectors, comments, colors, backgrounds, borders, margins, padding, Hight/ width, Box model, outline, text, fonts, icons, link, lists, tables, displays, max-width, position, overflow, Float, inline-block, align combinators, pseudo-class, pseudo-elements, Opacity, Navigation bar, drop downs, image gallery, Attribute selectors, forms, counters, website layouts, Modules, backgrounds, border images, round corner , text effects, web fonts, 2D transformation, 3D transformation, transitions, Animations, tooltips, Style images, image reflections, object positions etc.

MODULE -III

Java Script introduction ,Versions , Statements, Syntax, Comments, Variables, Operators, Arithmetic, Assignment, Data Types, Functions, Objects, Events, Strings, String Methods, Numbers, Number Methods, Arrays, Array Methods, Array Sort, Array Iteration, Array Const, Dates, Date Formats, Date Get Methods, Date Set Methods, Math, Random, Booleans, Comparisons, Conditions, Switch, Loop For Loop, For In, Loop For Of, Loop While, Break, Type Conversion, Bitwise,RegExp, Errors, Scope, Hoisting, Strict Mode, this Keyword, Arrow Function, Classes, JSON, Debugging, forms, Object Definitions, Object PropertiesObject, MethodsObject, DisplayObject, AccessorsObject, ConstructorsObject, Prototypes, Function: DefinitionsFunction, ParametersFunction, InvocationFunction, Call Function.

MODULE – IV

DOM, IntroDOM, MethodsDOM, Document, Elements, DOM Animations, CSS DOM, DOM Events, DOM Event Listener, DOM Navigation, DOM Nodes, DOM Collections, DOM Node Lists. jQuery Introduction, Get Started, Syntax, Selectors, Events, Hide/Show, Fade, Slide, Animate, stop(), Callback, Chaining, Get, Set, Add, Remove, CSS, Classes, jQuery css(), Dimensions, Traversing, Ancestors, Descendants, Siblings, Filtering,jQuery AJAX Introduction, jQuery Load, jQuery Get/Post.

MODULE -V

Bootstrap, Get Started, Grid Basic Typography, Tables, Images, Jumbotron, Alerts, Buttons, Button, Groups, Glyphicons, Badges/Labels, Progress Bars, Pagination, Pager, List Groups, Panels, Dropdowns, Collapse, Tabs/Pills, Navbar, Forms, Inputs, Inputs 2, Input Sizing, Media Objects, Carousel, Modal, Tooltip, Popover, Scrollspy, Affix, Filters,Grid System, Stacked/Horizontal, Grid Small, Grid Medium, Grid Large, Grid Examples, Templates, and Theme "Simply Me", Theme "Company", “Band”. Introduction to content management system, WordPress Introduction, History, Installation, Dashboard, Creating a Website or Blog, WordPress post, pages, Categories, Tags, Users, comments, Backup, updating , Optimization.
Website Development, Website’s overview, Websites Types, Website Designing, Website Publishing, Website URL registration, Website Hosting, Website Security, Search Engine Optimization, Website Monetization.

Reference Books:

- HTML & CSS: Design and Build Web Sites, Jon Duckett
- Responsive Web Design with HTML5 and CSS3, Ben Frain
- Learning Web Design, Author: Jennifer Niederst Robbins
- HTML, XHTML, and CSS, Sixth Edition, Author: Elizabeth Castro

BCA 403

Computer System Architecture

Course objective

Graduates get exposure of digital computer system, digital device along with their working manner and conceptual behavior.

Course Outcome

- Graduates get ability to understand digital devices.
- Graduates get ability to figure out the working manner of digital system.
- Graduates able to establish and run a digital system with overall knowledge of related devices.

MODULE-I

INTRODUCTION- Computer, Digital Computers, Types of Computers, Computer Architecture, Computer Organization, Difference between Computer Architecture and Organization, Structure and Functions, Microprocessor (µp), Working of Microprocessor, Microprocessor 8085 Architecture, Speed of Microprocessors, NUMBER SYSTEM AND ITS REPRESENTATION - Data Types, Number System, Number System Conversion, Binary Arithmetic, Integer and Floating Point Representation Overflow and Underflow

MODULE-II

COMPUTER CODES - Introduction, BCD (Binary Coded decimal) Code, EBCDIC Code, ASCII Code, Excess-3 Code, Gray Code, Error Detection Code, Error Correction Code. BASIC BUILDING BLOCKS - Logic Gates , Universal Gates, Exclusive Gates, Bubbled Gates, Universality of NAND and NOR gates. BOOLEAN ALGEBRA - Boolean Variable, Boolean algebra, Boolean Functions and Truth Tables, Logic Diagram, Laws of Boolean Algebra, Demorgan's Theorems, Simplification of Boolean Functions, Implementation Using Basic Gates, To Obtain Expression from Logic Circuits, Karnaugh Map (K Map), Simplification of Boolean expression using K-map, don't care conditions.

MODULE-III

DIGITAL LOGIC CIRCUITS - Introduction, Combinational Logic Circuit, Sequential Logic Circuits, Data Path and Memory Bus, Arithmetic and Logic Module (ALU), Memory, Static Random Access Memory (SRAM), Dynamic Random Access Memory (DRAM), Control Module (CU). BASIC COMPUTER ORGANIZATION - Register Transfer language and Micro- operations, Instruction Codes , Instruction Set, Operations and Operands, Computer Registers, Instruction Format, Instruction Cycle, Addressing Modes, Real and Protected Addressing Modes, Assembly Language Programming, Input-Output and Interrupt.

MODULE-IV

CENTRAL PROCESSING MODULE DESIGN - Central Processing Module (CPU), BUS Organization, Register Organization, Stack Organization, Data Path and Control Signals, Types of Processor (CPU) , Micro Programmed Control and Hardwired Control, Pipelining, Software - Hardware

Interaction layers in Computer Architecture. MEMORY ORGANIZATION - Computer Memory, Characteristics of Memory, Modules of Memory, Data Accessing/Storing Methods in Computer Memory, Memory Hierarchy, Classification of Memory, Associative Memory, Virtual Memory, Memory Management System

MODULE-V

INPUT-OUTPUT ORGANIZATION, Transfer of Information between I/O Devices, CPU & Memory, Data Transfer Format , Types of Data Transfer , I/O Interface , Modes of Data Transfer, I/O Channels and Processors, Input/Output Identification (Peripheral or Memory Mapped), Conditions of Data Transfer. Optimizing Hardware Performance - Memory Hierarchy, Cache, Virtual Memory, Pipelining, Pipelining Hazards, Conclusion, Superscalar CPU, Brief Historical Detour into Supercomputing, Superscalar Principle

Reference:

- Digital Computer & logic Design, M. Morris Mano, Pearson Publication
- Fundamentals of Digital Circuit, A.Anand Kumar, PHI
- Computer Architecture, sheetanshu rajoriya, Pragya

BCA 404

Big Data Management

Course Objectives:

The main objective of this course is to teach students:

- The basics of Hadoop , Mapreduce algorithm
- In big data analytics, students will do hands on various tools of big data. In this course, students will get overview of HDFS, MR, YARN and various other components of Big data.
- Lots of practise to ensure that we are very comfortable handling an Analytics project on Big Data.

Learning Outcomes:

- Through this course students should be able to
- Analyze the need and importance of fundamental concepts of Big Data
- Understand internal functioning of different modules of Apache Hadoop
- Evaluate performance of Big Data problems using Map Reduce model
- Infer results of real time applications using Apache Flume

MODULE I – Introduction to Big Data

Introduction – distributed file system – Big Data and its importance, FiveVs, Drivers for Big data, Big data analytics, big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

MODULE II – Introduction Hadoop

Big Data – Apache Hadoop & Hadoop Ecosystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

MODULE- III Hadoop Architecture

Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, HadoopMapReduce paradigm,

Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH &Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

MODULE-IV Hadoop Ecosystem and YARN

Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New FeaturesNameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

MODULE-V HIVE and HIVEQL, HBASE

Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying, Data - Sorting And Aggregating, Map Reduce Scripts, Joins &Subqueries, HBase conceptsAdvanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

REFERENCES

- Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
- Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
- Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.
- VigneshPrajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.

BCA 405

Mini Project

BCA 406

Client Server Architecture Implementation and Networking (CSAIN)

Course Objective

Objective is to provide concept of Networking and Establishment of Network with the basic protocol of computer networks along with their implementation.

Course Outcome

- Identify the different component in a Network and their respective tools.
- Describe the technical issues related to all kinds of networks.
- Identify the common technologies available in establishing Network and Communication.

MODULE-I

Network Basics - Network concepts, Network Architecture, Types of Network, Network Topology, Client Server Architecture. OSI Model - Concept of Data, Concept of Information, Concept of System, OSI model and its characteristics, Layers in OSI model, Working Manner and Features of Each Layer, Wired Computer Connection - Guided Media, Unguided Media, Wired Communication Channel, Wired network connection, NIC, Modems

MODULE-II

Network to Network Connection - Analog and Digital Signal, Switching Technique, Peer to Peer Connection, and Network-to-Network connection, Components of Network-to-Network Connection, Characteristics and Features of LAN, LAN wiring, LAN test. Wired Internetworking Devices - Bandwidth, Broadband, Baseband, Server, Types of Server, Cloud Servers, Basic Internetworking Devices and Specialized Internetworking Devices, Properties of Internetworking Devices.

MODULE-III

Wired Communication Standards: TCP Model, TCP/IP Protocol Suite, Working Manner of TCP/IP Layers, and IEEE Standard for Wired Connection. Wireless Networking: Wireless Network Devices, Wireless Communication Channels, Satellite, IEEE Wireless Networking Standards, Wireless configuration. Internet and Protocols: Internet, WWW, Web Browser, HTTP, UDP, Telnet, SMTP, FTP, DHCP, ICMP, IGMP.

MODULE-IV

Addressing: IP Address, Addressing Techniques, IP V4 Addressing, IP V6 Addressing, Domain Name System. Operating System and Devices: Operating System, Types of Operating System, Facilities and Features of OS, Network Operating System, Advantages of Network Operating System, Supporting Device, Device Driver. Security Threats and Mitigation: Security Issues in Network, Virus, Malwares, System Failure, Hardware Failure, System Crash, Natural Disasters, Data and Information Security.

MODULE -V

Security Practices: Antivirus, Password, Firewall, Troubleshooting, Backup, System Restore, System Security, Network Security. Network Access control: Authentication and Authorization, Cryptography, Types of Cryptography, Public Key Cryptography, Remote access and wireless security, MAC features and Uses.

Reference Books:
Computer Networks – A. S. Tanenbaum.
Data Communication and Networking - Forouzan.

BCA 407
Java FX and Advanced Programming in Java Lab

BCA 408
Web Designing and Hosting Lab

BCA 501

Linux/Unix Programming

Learning Outcomes:

- You will determine Linux basic commands.
- You will be able to manage Linux server.
- You will be able to manage security system.
- You will understand about installing packages.

MODULE – I

Overview of Linux, what is Linux? Linux S root in Unix, Common Linux Features, Advantages of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories, Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, file comlprision.

MODULE-II

Essential Linux commands, processes in Linux, Process fundamentals, connecting processes with pipes, Redirecting input, Redirecting output, background processing, managing multiple processes, process scheduling, nohup command, kill, ps, who, find, sort, touch, file, file processing commands-cut,wc, plaste etc., Mathematical commands-expr, factor etc. Creating files with vi editor, Editing files with VI editor.

MODULE-III

Shell Programming, Basics of shell programming, various types of shell available in Linux, Comparisons between various Shells, Shell programming in bash, conditional statements, lopping statements, Case statements, Parameter passing and argument, Shell variables, System Shell variables, shell keywords, Creating Shell programs for automating system tasks.

MODULE – IV

System administration, Common administrative tasks, identifying administrative files, Configuration and log files, role of system administrator, Managing user accounts- adding users, deleting users, Changing permission and ownerships, creating and managing groups, Modifying groups attributes, Temporary disabling of users accounts, crating and Mounting files system, Checking and monitoring System performance, file security and permissions, becoming super user using su, Disk partitions and sizes, users, kernel, installing and removing packages, rpm commands.

MODULE – V

Simple Filter commands and Understanding various Servers: Filter commands-pr, head, tail, Filter commands-cut, sort, Filter commands-Uniq,tr, Filter using regular expression grep, Filter using regular expression egrep, sed, CHCP, DNS, Squid, FTP, Telnet.

References:

- Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
- Graham Glass & King Ables – UNIX for programmers and users, Third Edition, Pearson Education.
- Neil Mathew & Richard Stones – Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.

BCA 502

INTRODUCTION TO MS.NET FRAMEWORK and C#

Learning Objectives:

Computer programming skills are now becoming part of basic education as these skills are increasingly of vital importance for future job and career prospects. The MS.NET Framework, which is one of the most popular Framework worldwide. The course shows you how to use the free open-source Framework to write basic programs and high level applications using concepts such as Class, object, functions, variables, If Else statements, For loops, While loops, iterative recursive programs, file handling, database handling and web development. This course will be of great interest to all learners who would like to gain a thorough knowledge and understanding of the basic components of framework using the C# language – and might be a gentle introduction to programming for those who think they might have a longer term interest in the subject area.

Learning Outcome:

- Able to apply the principles C# programming.
- Write clear and effective C# code.

- Create applications using C# programming.
- Implementing database-using MySQL, Oracle etc.

MODULE-I

THE COMMON LANGUAGE RUNTIME (C.L.R.) : CLR Architecture and Services , The .Net Intermediate Language (IL), Just- In- Time Compilation and CLS, Disassembling .Net Application to IL, Strict Type Checking .NET FRAMEWORK CLASS LIBRARY: System Namespace, System .Object Namespace, System .Collection Namespace, System .Type .SYNTAX & DATA TYPES LANGUAGE FUNDAMENTAL: Data type and Control Constructs, Value and Reference Types, Declaring and Initializing Variables, Unicode Characters and Strings , C.T.S Type, Implicitly Typed Local Variables, Conditional Syntax ,C# Operator, Looping Syntax , Structure. ARRAY & STRING : Arrays in General ,Declaring of different type Arrays, Initializing Arrays, Accessing element of different type Array Members, Arrays of Objects, Structure type array, Using for each with Arrays, Understanding System. String class and its various operations.

OOPS CONCEPTS CLASSES: Encapsulating Attribute, Class & Object Creation, Define Constructor, Type of Constructor, Define Methods and their Type, Overloading Methods and Constructor overloading, Define Property and their Types, The Memory Allocation with New Keyword, Passing Initial Values with Constructor, Invoking Property and Methods INHERITANCE: Implementing Inheritance Hierarchies, Class Access Modifiers, Method Overloading, Overriding and Hiding Concepts, Run time polymorphism, Abstract and Sealed Class, Exposing Interface, Implementation Interface in a Class, Play with Namespaces, Interface Polymorphism, Operator Overloading, Partial Class.

MODULE-II

EXCEPTION HANDLING: Means of Error, Bug and Exceptions, Role of .Net Exception Handling, System Level Exception, Application Level Exception, Try and Catch Block, Handling Multiple Exception, Finally Block, Throw Exception on Request Custom Exception EVENTS AND DELEGATES: Event Driven Programming, Delegate, Event and its association, Synchronous and asynchronous operation with delegate, User Defined events and delegates, Multicasting with Delegates, Anonymous methods, Anonymous Methods with events, Generic Delegates. MULTITHREADING: Understand multithreading process, The System Threading namespace, The Thread and Thread Start class, Thread life cycle, Thread Safety Concept, Thread synchronization, Understanding Thread Pool, Understanding Role of Thread Background Worker Component. I/O OPERATIONS WITH FILE SYSTEMS: File and Directory Class, Marshal Classes, File Info and Directory Info, Path Class, Drive Info Class, Stream Object with Files: Stream Reader, Stream Writer, File Stream and Memory Stream.

MODULE-III

INTRODUCTION TO ADO.NET: How ADO.NET works and how it differs from ADO?, Evolution of ADO to ADO.NET ADO.NET AND IT'S ARCHITECTURE, Connection Object, Command Object, Dataset, Data Reader Object, Data Adapter Object, and the Disconnected Data Architecture, Provider. DATA SET Creating Tables in Dataset, Data Column, Data Row, Data Table, Updating, Inserting and Modification in Data Table, Saving Changes into Data Base using Command Builder, Working with Command and Connection CONNECTIONS AND COMMAND OBJECT: Connection Object, Command Object, Execute Non Query, Execute Scalar. DATA READER: Reading Data in Connected Environment, Moving and Accessing Value of Record, Execute Reader. DATAGRIDVIEW & DATA BINDING: Row State Filter and Sort Property, Update records via a Datagridview, Insert records via a Datagridview, Delete records via a Datagridview.

MODULE-IV

INTRODUCTION TO WEB FORM : Need of Web Application,Http Protocol, Static and Dynamic Page, Concept Working of IIS and Browser, Differences between ASP and ASP.NET INTRODUCTION TO HTML CONTROLS: Creating a Simple HTML Page, Html Tags, Hosting a HTML Page, IIS virtual Directory, Request Transfer Throws Get and Post Methods: SERVER PAGES USING ASP.NET: Creating sever pages, Architecture of handling request In Web server, Http request object, Http response object, Understanding post back UNDERSTANDING PAGE LIFE CYCLE: Understanding of Application Life Cycle, Page Life-cycle Stages, Life-cycle Events, Autoeventwireup, Tracing and debugging asp.net pages. STATE MANAGEMENT: Client side State Management, Introduction of stateless process, Http Cookies, Query String Method, View State Hidden Field, Server Side State Management, Http Session, Http Application, Global.asax, Web. Config SERVER CONTROL FORM VALIDATION: Working with Range, Regular Expression & Compare, Required Field Validator Controls, Use Control to Validate Property, Custom Validator Control, Implementation of Client and Server Side Validation, Working with Validation Summary WEB FORM CONTROL: Textbox, Check Box, List Box, Dropdown List Control, Add Rotator Control, File Upload Control, Multi View Control, Login Control, Image control, Radio button control. DATA BINDING SERVER CONTROLS: Use of Data Binding Control, Type of Data Binding Control (Formatted and Unformatted) Working with Grid View Control, Data binding with Grid View, Working with Column Collection, Using Paging o Sort, Working with Data List Control, Working with Template, Working with Data List Events: MASTER PAGES: Introduction and Need of Master Page, Creating a Master Page, Default Contents, Master page with CSS and table layout, Applying Master Page through Configuration File Dynamic setting a Master Page, Nested Master Page, Master Page and Relative Path.

MODULE-V

ASP.NET WEB SECURITY: Windows, Forms, Passport ASP.NET AJAX: Introduction of AJAX, Role of script manager, Understanding and working with update panel, Understanding and Working with Timer control, Creating AJAX enabled website, Creating an AJAX enabled web service, SKIN & THEME: Cascading Style Sheets, Scoping Themes, Themes Vs Cascading Style Sheets, Create a Skin, Apply a theme to a Web Site. CASCADING STYLE SHEET: Creating style sheet, Apply Style Sheet, Creating Rules, Creating Elements setting. MORE DATA BINDING SERVER CONTROLS: Working with Form View Control, Working with Template, Working with Form View Events,Working with Details View Control, Working with Template, Working with Details View Events, Understand Event Bubbling. ASP.NET CACHING : Introduction ,Need ,Type of caching, Page output Caching, Declarative output caching, Time duration and location setting, Parameter caching settings, Page fragment Caching ,Time duration setting, Parameter caching Setting, Parameter caching setting, Caching with HTTPCachePolicy Class, Post Cache Substitution & Fragment, Data Caching, Managing Data into cache, XML classes.

- Access database using C# and ASP.Net programming.
- Develop web applications using ASP programming.
- Develop and use Web Services using ASP.

Reference Book:

- Programming In C#, 3E,Balagurusamy,Tata McGraw-Hill Education, 2010
- Practical Performance Profiling: Improve the Efficiency of .NET Code
- O'Reilly® Designing Evolvable Web APIs with ASP.NET
- .NET Technology Guide for Business Applications

BCA 503

GREEN COMPUTING

Course Objectives:

- To introduce Green Computing, that support Green technologies.
- To understand the use of Green technology over such devices to support Green Computing
- To understand the basic concepts of Green Computing is presently a hot technology worldwide.

Learning Outcomes:

- At the end of the module, the student will be able to demonstrate:
- A working understanding of the characteristics and limitations of Green Computing including their user-interface modalities
- The ability to develop applications that are environment.
- A comprehension and appreciation of the design and development of context-aware solutions for environment

MODULE I:

Overview and Issues: Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power. Initiatives and Standards: Global Initiatives: United Nations, Basel Action Network, Basel Convention, North America: The United States, Canada, Australia, Europe, WEEE Directive, RoHS, National Adoption, Asia: Japan, China, Korea.

MODULE II:

Minimizing Power Usage: Power Problems, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, Low Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, and Software. Cooling: Cooling Costs, Power Cost, Causes of Cost, Calculating Cooling Needs, Reducing Cooling Costs, Economizers, On-Demand Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised Floors, Cable Management, Vapour Seal, Prevent Recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Datacentre Design, Centralized Control, Design for Your Needs, Put Everything Together

MODULE III:

Changing the Way of Work: Old Behaviours, starting at the Top, Process Reengineering with Green in Mind, Analysing the Global Impact of Local Actions, Steps: Water, Recycling, Energy, Pollutants, Teleworkers and Outsourcing, Telecommuting, Outsourcing, how to Outsource. Going Paperless: Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational Realities, Changing Over, Paperless Billing, Handheld Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office SharePoint Server 2007, Electronic Data Interchange (EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles.

MODULE IV:

Recycling: Problems, China, Africa, Materials, Means of Disposal, Recycling, Refurbishing, Make the Decision, Life Cycle, from beginning to end, Life, Cost, Green Design, Recycling Companies, Finding the Best One, Checklist, Certifications, Hard Drive Recycling, Consequences, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs, good and bad about CD and DVDs disposal, Change the mind-set, David vs. America Online Hardware Considerations: Certification Programs, EPEAT, RoHS, Energy Star, Computers, Servers, Consolidation, Products, Hardware Considerations, Planned Obsolescence, Packaging, Toxins, Other Factors, Remote Desktop, Using Remote Desktop, Establishing a Connection.

MODULE V:

Greening Your Information Systems: Initial Improvement Calculations, Selecting Metrics, Tracking Progress, Change Business Processes, Customer Interaction, Paper Reduction, Green Supply Chain, Improve Technology Infrastructure, Reduce PCs and Servers, Shared Services, Hardware Costs, Cooling. Staying Green: Organizational Check-ups, Chief Green Officer, Evolution, Sell the CEO, SMART Goals, Equipment Check-ups, and Gather Data, Tracking the data, Baseline Data, Benchmarking, Analyse Data, Conduct Audits, Certifications, Benefits, Realities, and Helpful Organizations.

Reference Books

- Toby Velte, Anthony Velte, Robert Elsenpeter, "Green IT", McGraw Hill, 2008
- Alvin Galea, Michael Schaefer, Mike Ebbers,"Green Data Center: Steps for the Journey",Shroff Publishers and Distributers,2011.
- Bud E. Smith,"Green Computing Tools and Techniques
- For Saving Energy, Money and Resources",CRC Press,2014.

BCA 504

Elective I

- Graph Theory
- Operation Research

Graph Theory

Objective:

Graph Theory is ultimately the study of relationships. Given a set of nodes & connections, which can abstract anything from city layouts to computer data, graph theory provides a helpful tool to quantify & simplify the many moving parts of dynamic systems.

Outcomes:

We are able to define the basic concepts of graphs, directed graphs, and weighted graphs. Defines a graph, identifying edges and vertices. Finds the degree of a vertex. Explains basic results about colouring vertices

MODULE I:

Definition of a graph-finite and infinite graphs - incidence and degree ,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 & Circuits.

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),

MODULE III:

Fundamental circuits and Cut sets, Edge Connectivity - Vertex connectivity – Separable Graphs – Planar Graphs - Kuratowski's graphs – Different representations of Planar graphs (No Theorems)..

MODULE IV:

Incidence Matrix A, Circuit Matrix B, Fundamental Circuit Matrix and Rank of B, Cut set Matrix C - Relationship between A,B and C, Path Matrix ,Adjacency Matrix.

MODULE V:

Coloring of a Graph, Chromatic number - Chromatic Partitioning – Chromatic Polynomial – Coverings - Four Color Problem (No theorems), Definition of Directed Graphs & Related definitions.

References

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

Operation Research

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

Outcomes: Formulate optimization problems, apply the concept of Optimality criteria for various type of optimization problem, and apply the methods of Optimization in real life situation.

MODULE I:

Linear Programming Problem (L.P.P.): Introduction, Formulation of the problem, Graphical method, Some exceptional cases, Simplex method, Working procedure of the Simplex method, Duality concept, Duality principle, Dual simplex method.

MODULE II:

Transportation Problem: Mathematical Formulation, Concepts of Solution, Feasible Solution, Optimal Solution by MODI Method: Initial Basic Feasible Solution by North-West Corner Rule, Matrix Minima Method, Vogel's Approximation Method. Optimality Test. Improvement Procedure.

MODULE III:

Assignment problem: Solution by Complete Enumeration Method and Hungarian Method. Adjustments when Problem is of Maximization type and/or Unbalanced. Travelling Salesman Problem.

MODULE IV:

Sequencing: Processing n Jobs through 2 and 3 Machines and 2 jobs through m. Machines.

MODULE V:

CPM and PERT: Objective and Outline of the techniques. Diagrammatic representation of activities in a project: Bar Diagram (Grant Chart) and Network Diagram. Slack time and Float times. Determination of Critical path.

Name of Reference Books:-

- Gillett B.E, Introduction to Operation Research- A Computer Oriented algorithmic approach, Mc Graw Hill.
- Kanti Swarup, Gupta.P.K.,Man Mohan, Operations Research, Sultan Chand&Sons.
- Vohra N.D.,Quantitative Techniques in Managemental, T.M.H.,1990.
- Zoints. S.,Linear & Integer Programming,Prentice Hall,1975. 5. R.K.Gupta, Operational Research, Krishna Prakashan, Mandir, Meerut

BCA 505

Elective II

- Management Information System (MIS)
- Internet of Things

Management Information System

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.

Internet of Things

Course Objectives:

Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Devices.

Course Outcomes:

Able to understand the application areas of IOT · Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks · Able to understand building blocks of Internet of Things and characteristics.

Module1:

Introduction to IoT and its important, Elements of IoT, IoT enabling technologies: IoT Levels, IoT and M2M, physical and logical design of IoT.

Module 2:

IoT Standardization: Various Standardization organization, WSN Protocols SCADA and RFID , Protocols – IEEE802.15.4 - BACNet Protocol, Modbus , KNX , Zigbee, Network layer, APS layer, CoAP Security.

Module 3:

IoT Architecture - IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models, IoT reference model , IoT domain model, IoT functional model, IoT information model, IoT communication model.

Module 4:

IoT Applications - IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.

Module 5:

Introduction of hardware used in IoT like Aurdino, raspberry Pi, Programming language for IoT , open simulators for IoT, case study on water distribution Network.

Text & References Book:

- Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
- Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
- David Easley and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning About a Highly Connected World", Cambridge University Press, 2010.
- Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things – Key applications and Protocols", Wiley, 2012.

BCA 506
Industrial/Company/Professional Training

BCA 507
Linux/Unix Programming Lab

BCA 508
Introduction to MS .Net and C# Lab

BCA 601

Subject- ASP .Net Using C#

Subject outcomes:

- You will be able to understand about MS.net framework.
- You will be able to understand about basic C# programming.
- You will be able to understand about IIS.
- You will be able understand about MVC etc.

MODULE I:

An Introduction to C#, what is .NET? , What is the CLR? , The FCL, Primitive Types, Namespaces, Statements and Expressions, Operators 2. Classes and Objects, Constructors, Reference Types, Object Oriented Programming, Inheritance, Access Modifiers, abstract Classes, Virtual Members, Static Classes, Sealed Classes, Partial Classes.

MODULE II:

ASP.NET, Web Application using ASP.NET, ASP.NET Architecture, Control-based Programming, User Interface Elements, Deployment, Web Sites, Applications, and Virtual Directories in IIS, ASP.NET Diagnostics and Health Monitoring

MODULE III:

ASP.NET Working with Data, Data Binding, State Management, Validation, Caching 18. ASP.NET 3.5 Security, IIS 6 & IIS7 URL Authorization, Form's authentication, Role-based authorization, trimming site maps with roles, Config file encryption, ASP.NET Membership, Resources and Internationalization.

ADO.NET, Connected Architecture, Disconnected Architecture, Working with Transaction

MODULE IV:

ASP.NET 3.5 Advanced Topics, HTTP Pipeline, Custom Controls, Web Parts, Web Services. ASP.NET AJAX, ASP.NET Ajax Introduction, ASP.NET Ajax Server Controls, ASP.NET Ajax Server Data, ASP.NET Ajax Client-side Library, ASP.NET Ajax Control Toolkit

MODULE V:

ASP.NET MVC, Web Application using MVC Pattern, Razor View Controller, Model, Entity Framework, Introducing the Entity Framework, Code First Approach. Windows Communication Foundation(WCF), WCF Configuration, Hosting WCF Services in Windows Services, Hosting WCF Services in IIS, Building RESTful services with WCF.

Reference Books:

1. BL Jones (2002). SAMS Teach Yourself C# in 21 Days, SAMS.
2. 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.

BCA 602

Extensible Markup Language System Development Project XML

Learning outcomes:

- You will be able to understand about Http Architecture
- You will be able to understand about XML
- You will be able to understand about DOM.
- You will be able to understand about XSLT.
- You will be able to understand about DTD.
- You will be able to understand about XSD.

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.,XML Tree, XML Syntax, XML Attributes, XML Namespaces, XML Display, XML Http Request, XML Parser, XML Server. AJAX Introduction, AJAX XML, Http AJAX Request, AJAX Response, AJAX XML File, AJAX PHP, AJAX ASP, AJAX Database, AJAX Applications.

MODULE - II

DOM Introduction, DOM Nodes, DOM Accessing, DOM Node Info, DOM Node List, DOM Traversing, DOM Navigating, DOM Get Values, DOM Change Nodes, DOM Remove Nodes, DOM Replace Nodes, DOM Create Nodes, DOM Add Nodes, DOM Clone Nodes, XPath Introduction, XPath Nodes, XPath Syntax, XPath Axes, XPath Operators, XPath Examples

MODULE - III

XSLT Introduction, XSL Languages, XSLT Transform, XSLT <template>, XSLT <value-of>, XSLT <for-each>, XSLT <sort>, XSLT <if>, XSLT <choose>, XSLT Apply, XSLT on the Client, XSLT on the Server, XSLT Edit, XMLXSLT Examples.

MODULE-IV

XQuery Introduction, XQuery Example, XQuery FLWOR, XQuery HTML, XQuery Terms, XQuery, Syntax XQuery, Add XQuery Select, XQuery Functions. DTD Introduction, DTD Building Blocks, DTD Elements, DTD Attributes, DTD Elements vs Attr, DTD Entities, XSD Introduction, XSD How To, XSD <schema>, XSD Elements, XSD Attributes, XSD Restrictions.

MODULE -V

XSD Elements, XSD Empty, XSD Elements Only, XSD Text Only, XSD Mixed, XSD Indicators, XSD <any>, XSD <anyAttribute>, XSD Substitution, XSD Example, XSD String, XSD Date, XSD Numeric, XSD Misc., XSD Reference, XML Services, XML WSDLXML SOAP, XML RDF, XML RSS.

Reference Books:

- "XML the Complete Reference" by Heather Williamson, McGraw-Hill.
- "XML Complete" by Steven Holzner, McGraw-Hill.
- "XML by Example: A Webmaster's Guide" by Sean McGrath, Prentice Hall.

BCA603

Elective III

- Data Mining Techniques
- Cryptography

Data Mining Techniques

Course Objective

Objective is to introduce the basic concepts of Data Warehouse and Data Mining techniques and discover interesting patterns, analyses 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 of Data mining

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 Ltemset 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 V: 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:

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

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:

- William Stallings, "Cryptography and Network Security: Principles and practice", Pearson Education Inc., 1999.
- Baxer, "Networking Security", McGraw Hill, 1996.
- Derek Atkins, "Internet Security", Tech media, 1998.
- Simonds, "Network Security", McGraw Hill, 1998.

BCA 604

ELECTIVE IV

- Internet Security
- Cloud Computing

Internet Security

Course Objectives

Enable the students to learn fundamental concepts of internet security, cyber security, cyber law and cryptography and utilize these techniques in computing systems.

Course Outcomes:

Spread awareness among students about internet security, cyber security and cyber crime. Also Students will have knowledge of Ethical Hacking and encryption techniques,

MODULE I:

Introduction of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats, Comprehensive Cyber Security Policy, Cyber Security Awareness, Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration.

MODULE II:

Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Cyber Security Safeguards: Access control, Audit, Authentication, and Biometrics.

MODULE III:

Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography. : Firewalls- Types of Firewalls, User Management, VPN Security.

MODULE IV: Intrusion Detection Systems, Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software.

MODULE V:
Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards, National Cyber Security Policy 2013.

Text book

- William Stallings, "Cryptography and Network Security: Principles and practice", Pearson, Education Inc., 1999.
- Baxer, "Networking Security", McGraw Hill, 1996.
- Derek Atkins, "Internet Security", Techmedia, 1998.

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 and Simulators

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. Introduction of CloudSim and GreenCloud.

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.

BCA 606
ASP .Net using C# Lab

BCA 607
Extensible Markup Language Lab