



University of Gour Banga

Malda, Pin: 732103

Syllabus of Bachelor of Computer Application

Full marks: 1800

UNIVERSITY OF GOUR BANGA

Course structure and detailed syllabus of Computer Application

Duration of the course: 3 (Three hours)

Total Marks:

1800

Subjects/Papers	Instruction Period Per week	Max. Marks
1st Semester ::: Total Marks : 300		
English	<i>Course - 11</i>	3
Mathematics	<i>Course - 12</i>	3
Introduction to Information Technology	<i>Course - 13</i>	3
Basic Electronics and Introduction to Logic & Organization	<i>Course - 14</i>	3
Physics	<i>Course - 15</i>	3
Laboratory I (Windows and office Tools)	<i>Course - 16</i>	3
2nd Semester ::: Total Marks : 300		
Mathematics	<i>Course -21</i>	3
Data Structure through C Language	<i>Course -22</i>	3
Business Systems Analysis, MIS and ERP Fundamental	<i>Course -23</i>	3
Computer Architecture	<i>Course -24</i>	3
Other Languages(English)	<i>Course -25</i>	3
Laboratory II (Data Structure through C)	<i>Course -26</i>	3
3rd Semester ::: Total Marks : 300		
System programming	<i>Course -31</i>	3
Computer Oriented Numerical & Statistical methods	<i>Course -32</i>	3
Microprocessor and Assembly Language	<i>Course -33</i>	3
DBMS with ORACLE	<i>Course -34</i>	3
OOP with C++	<i>Course -35</i>	3
Laboratory III (C++)	<i>Course -36</i>	3
4th Semester ::: Total Marks : 300		
Computer graphics	<i>Course -41</i>	3
Visual Programming with VB	<i>Course -42</i>	3
Windows Programming	<i>Course -43</i>	3
Data Communications and Computer Networking	<i>Course -44</i>	3
Laboratory V (Windows Programming)	<i>Course -45</i>	3
Laboratory VI (Visual Basic with Oracle)	<i>Course -46</i>	3
5th semester ::: Total Marks : 300		
Optimization Techniques (OT)	<i>Course -51</i>	3
Web Technology with JAVA	<i>Course -52</i>	3
UNIX and Shell Programming	<i>Course -53</i>	3
Software Engineering	<i>Course -54</i>	3
Laboratory VII (UNIX, Networking)	<i>Course -55</i>	3
Laboratory VIII (JAVA and Internet Lab)	<i>Course -56</i>	3
6th Semester ::: Total Marks : 300		
Environmental Studies	<i>Course -61</i>	3
Elective I	<i>Course -62</i>	3
Elective II	<i>Course -63</i>	3
Elective III	<i>Course -64</i>	3
Presentation of Project	<i>Course -65</i>	3
Project Viva Voce	<i>Course -66</i>	3

Elective Papers

(One Subject each group of **Elective I**, **Elective II** and **Elective III** to be Chosen)

Elective I	Elective II	Elective III
a. Digital Image Processing	a. Compiler Construction	a. Financial Accounting
b. Advanced DBMS	b. Internet and TCP/IP Programming	b. Managerial Economics
c. AI and Expert Systems	c. Simulation and Modeling	c. Human Resources Management

DETAILED SYLLABUS

COURSE 11: ENGLISH :

- Poem:** i) The summer in Calcutta, ii) After words, iii) Oh captain my captain.
- Poetry:** i) How a client was saved, ii) The pankester of the sea, iii) The old man at the bridge.
- Drama:** The rising of the moon.
- Others:** i) Letter writing, ii) Report Writing, iii) Summary writing.

COURSE 12: MATHEMATICS :

Vectors: Addition of vectors, scalar and vector products, triple scalar product and triple vector products. Simple applications in Mechanics and geometry. **Determinants:** Cofactors and minors, multiplications of determinants, solution of equations by Cramer's rule. **Integral Calculus:** Indefinite integrals method of substitutions, integration of different trigonometric and algebraic functions, integration by parts. successive integration, integration of rational in irrational functions. General properties of definite integrals, definite integral as limit of sum, summation of series, area under different shapes and curvatures. **Matrices:** Definitions – symmetric, skew-symmetric, identity, rank etc. Matrix operations – addition multiplications, transpose, adjoin and inverse of matrix. Solution of linear equations by Matrix method.

COURSE 13: INTRODUCTION TO INFORMATION TECHNOLOGY :

Basic Concepts: Data Information, Evolution of information processing. Information processing cycle. **Elements of Computing system:** Hardware, Software, Firmware. Hardware – CPU, Input/Output devices. Storage devices and media. Storage Classification – Primary, Secondary, Software – system software, application software, utilities. **Language development:** Evolution, Classification – lower level, higher level machine language, assembly language, merits and demerits of HLL. Low level languages: assemblers, Compilers, interpreters, fourth generation languages. **Operating Systems Concepts:** Definitions – resource manager, interface between hardware and end-users: different management techniques (memory, device etc.) Classifications – single user, multi users, DOS/UNIX/Networked OS. GUI – Windows: different commands, windows explorer, device integration, software installations under windows, command interpreters. **Information Dissemination:** Computer and Communication: Networks – LAN, MAN, WAN – definitions and structures, protocols, client server systems: Internet – WWW, HTTP, Mosaic, Gopher, HTML, E-mail, Web

Mail, Dial up system, MODEM, Browsing. **Protection of information:** Needs, concepts and components of security: protection – PC-level, multi-user level, network level including internet, perverse software. **Social Applications:** Scientific educational, business, entertainment, industrial, planning, etc.

COURSE 14: BASIC ELECTRONICS AND INTRODUCTION TO LOGIC & ORGANIZATION :

1. Introduction to electronics and its applications:

Semiconductors: Definitions of solids (insulator, conductor, and semiconductor) using band diagram, effect of temperature on semiconductors, effects on doping: Intrinsic and extrinsic semiconductor, p-type, n-type, expression for conductivity of a semiconductor. **Diodes:** Construction, principles of operation (forward biasing, reverse biasing). Characteristics, modeling (ideal model only) using clipping circuits, clamping circuits. Rectifiers: half wave, full wave (centre tap and bridge) capacitive filter. **Zener diode:** principle of op, ideal mode, use as voltage regulator, power supply. **Bipolar Junction:** Transistor (BJT): Types NPN, and PnP, constructions, principles of operations, use of amplifier, various amplifier configurations (common base, common emitter and common collector). input, output characteristics, concept of cut off, active and saturation regions DC load line, operating points (Q-point). **Other semiconductor devices and their uses:** JFET, MOSFET, UJT, SCR, DIAC, TRIAC, etc. **Realisation of Logic gates using TTL circuits.**

2. Representation of Information: Number systems – decimal, binary, octal, hexadecimal. Number representation – integer: positive and negative, floating point. Character representation – ASCII, EBCDIC, parity check. K-maps. Combinational Circuit design using AND, OR, NOT, NOR, XOR etc. Multiplexer. Adder Subtractor. 2's complement adder. Design of code converter. **Sequential circuits:** Flip-flop S-R, D, J-K, T. Master slave shift registers:- Serial in serial out. Serial in parallel of arbitrary counters using S-R and J-K flip-flop counter design. **Memory devices:** Memory cell, memory organizations, serial access, random access memories. Cache memories memory hierarchies. **CPU architecture (Intel 8085 may be taken as example):** Instruction format. Addressing modes-direct, indirect, immediate, relative, indexed, addressing formats – zero, Single, double, register addressing Instruction set, Introduction execution. fetch and execute cycle. Synchronization of memory I/O etc. **I/O Architecture:** properties of simple I/O devices transfer information between I/O devices, CPU and Memory Alleviating speed mismatch between I/O units and memory. Data transfer schemes – DMA I/O channel and peripheral processors. **Information structures/data structures:** basic concepts of data and their representation sequential and linked representations. Arrays, stacks, queues, chains, circular lists. doubly linked list. Tree – types, representations. Binary trees, tree traversal, graphs, application of stack queues. binary trees. File records. File organizations – sequential, random, direct.

COURSE 15: PHYSICS – Properties of matter, Mechanics, Acoustics and F :

Particle kinematics: Two and three dimensional motion: Elementary vector algebra scalar and vector products with applications in mechanics. Review of Newton's law of motion. Inertia Co-ordinate systems. Galilean Transformations and invariance. Application of law of motion in gravitational, electrostatic and moan forces. **Conservation Laws:** Conservation of linear momentum with applications. Elastic and inelastic collisions of two particles. Angular momentum: spin: central force problems, conservation of angular momentum wud and energy, work as line integral of force, conservative and neoconservative forces. Kinetic

and potential energy, work-energy theorem, conservation of energy. **Dynamics of rigid bodies:** Translation and rotation of a rigid body: moment of inertia: parallel and perpendicular axes theorem: moment of inertia of thin disk. Solid cylinder and solid sphere and their applications and solutions, dynamics of a simple harmonic oscillator, forces vibration. **Wave Propagation:** General motion of wave motion, plane and spherical waves. transverse waves in strings, longitudinal waves, energy flow, dispersion, group velocity, **dopler effect:** generation of ultrasonic and its uses. Electric Fields due to charge distribution: gauss's law and its application in determination of electric field due to a spherical distribution of charge: line charge, sheet of charge, surface distribution of charge. **Electrostatic Potential:** Energy of charge distribution, line integral of a electric field, potential of a charge distribution, derivation of field from potential. **Capacity and Condenser:** Capacity of parallel plate, spherical: and cylindrical condensers: Energy stored in condenser. Absolute electrometer and its use measuring dielectric constant and potential difference. Scalar and vector triple products, Preliminary knowledge of gradient divergence and curl.

COURSE 16: Laboratory I (Windows and office tools) :

Windows Basics: Windows components, Installing and managing applications. Adding , Removing installing printers. Changing of settings. Word Processing: Creating documents, editing, formatting, documents, creating multicolumn: importing graphics: find & replace: Word Art. PLE; table management. header footer, macro. Spreadsheet Management: Creating workbook, entering numbers, texts, formula, functions, creating charts, Macros.

COURSE 21: MATHEMATICS: INTEGRAL CALCULUS TRANSFORMATIONS DIFFERENTIAL EQUATIONS :

Laplace transformations: Inverse transforms shifting on the s and axes. Convolutions, partial fractions Fourier series. Half range expansions. Approximation by trigonometric polynomials. Fourier integrals Transform technique in differential equations (up to second order). Method of phase plane critical point and stability. Fourier's series in the intervals $(0, 2\pi)$, $(-\pi, +\pi)$, $(-1, 1)$, etc. Dirichlet's condition. Half range cosine series and sine series. Cauchy Riemann equation, complex integration. Cauchy fundamental theorem, Cauchy's integration formula. Taylor's theorem, Laurent's theorem. Singularity and residues. Contour integration. Lorenz theorem. Transformation technique "up to second order".

COURSE 22: DATA STRUCTURE THROUGH 'C' LANGUAGE :

Basic concepts of data representation: Abstract and system defined data types, representation, primitive data structures. Introduction to algorithm Design and Data Structure: Design and analysis of design. Analysis of algorithm- Frequency count complexity measures in terms of time and space, structured approach to programming. **Arrays:** Representation of Arrays: Single and multidimensional arrays. Address calculations using column and row major ordering. **Stack and queues:** Representation of stacks and queues using arrays, Circular queues. Applications of stacks-conversion from infix to prefix expressions. Evaluation to postfix expression using stacks. **Linked lists:** Singly linked list: operations on lists. Linked stacks and queues, polynomial representation and manipulation using linked lists, circular linked lists, doubly linked lists, generalized lists, sparse matrix representation using generalized list structure. **Storage allocation and garbage**

collection: Memory allocation strategies. first fit and best fit approaches. Boundary tag methods: memory freeing algorithm in each case. **Tree:** Binary tree traversal methods – preorder traversal, In order traversal, post order traversal, Recursive and non recursive algorithms for above mentioned traversal methods, representation of trees and its applications – Binary tree representation of a tree, conversion of forest tree thread threaded binary tree, Decision and games trees. **Symbol Table:** Static symbol table, hash tables, Binary search tree, Dynamic tree table – height balance tree (AVL). B-trees. **Searching and sorting:** searching: sequential and binary searches, indexed search, hashing schemes, Internal sorting – insertion, selection and bubble sort, quick sort, merge sort, heap sort, sorting on multiple keys. String and their features: String representation, string manipulations using arrays and list string matching . **Graphics:** Graphics representation – Adjacency lists, Adjacency matrix, traversal schemes – Depth first search, Breadth first search. **File Structures:** Organizations – sequential, random, indexed, direct. Business files. dat files. inverted files hashing.

COURSE 23: Business Systems, System Analysis. MIS and ERP Fundamentals :

Introduction to business Data processing: System definition and concepts- Characteristics and types of systems. Manual and automated systems. **Systems Analyst:** Role and need of systems analysis. Qualifications and responsibilities. Systems analyst as agent of change. **Project development:** term of references. Project selection. model study. **Feasibility study:** Types of feasibility reports, system selection plan and proposal prototyping cost benefit analysis tools and techniques. **System design and modeling:** process modeling , logical and physical design, design representation systems flow chart and structures charts. Common diagramming conventions and guidelines using DFD and ERD for Data Modeling and systems analysis. **Input and output:** Classification of forms. Input/Outputs form design, User interface design, Graphical interfaces. **System Implementations and maintenance:** Planning considerations, conversion methods, procedures and controls, system acceptance criteria, system evaluation and performance, Testing and validation, system quality control and assurance, maintenance activities and issues. **Change Over:** Methods for switching from old system to a new system. **System documentation considerations:** Principles of systems documentation. Types of documentation and their importance, Enforcing documentation and their importance, Enforcing documentation discipline in an organization. **Evolution of information systems:** Electronic data processing (EDP) systems, management Information Systems (MIS): Pyramid structures of MIS; Executive information (EIS). Information need of organization, strategic levels, Tactical level, Operational Level, ‘ERP’ as an integrator of information needs at various level. Decision making involve at the above level. manager as apart of information system and its role, mathematical concept of information. Entropy and information contents. I human as information processor: Study of TPS, DSS, ESS in details. quality of information. Age of information. **ERP module/Functionality:** Functional modules of ERP systems, sales order processing. MRP scheduling. Forecasting, Maintenance, distribution, Finance, Features of each of the modules, description of data flow across each module. Overview of the supporting data base Hardware platform. Communication and networks. **Implementation issues:** Pre implementation issues, Financial justifications of ERP, evaluation of commercial software. During – implementation issues, reengineering of various business processes, Education and training Project management , post implementation issues, performance measurement, case studies. **System Audit and Security:** Computer System as an expensive resource – Data and storage media, procedure and norms for utilisation of computer equipment, audit of computer system usage. Audit trails of threats to computer system and control measures – Threat and risk analysis. Disaster recovery and contingency planning.

COURSE 24: COMPUTER ARCHITECTURE :

Data Representation: Data types, Fixed point, floating point representations. other binary codes. error detection codes. Register transfer and micro Operation: Register transfer language. inter register transfer: arithmetic micro operation, logic micro operation, shift micro operation, control functions. **Basic Computer organization:** instruction codes. Computer instructions, timing and control. execution of instructions, input-output and interrupt. Design of Computer. **Central processor Organization:** Processor Bus organization. ALU, stack organization, Instruction formats, addressing modes. Data transfer and manipulation, program control, microprocessor organization, parallel processing.

Micro Program Control Organization: Comparison and subtraction of unsigned binary numbers. Addition and Subtraction algorithm. Multiplication algorithm, division algorithm. Processor configuration. Floating point operations. **Input-Output Organization:** Peripheral devices. I/O interface. Asynchronous Data transfer. DMA transfer, priority interrupt. I/O processor. Multiprocessor system organization. **Memory Organization:** Auxiliary Memory, Microcomputer Memory, Memory hierarchy, associative memory. Virtual memory, Cache memory, Memory management hardware.

COURSE 25: OTHER LANGUAGES (English) :

i) The rider of the sea, ii) The man eater of Malgudi, iii) The great goats.

Others: Essay writing, Report writing, Letter writing.

COURSE 26: LABORATORY II (Data Structure in C) :

- Generation of different algorithms using single and multi dimensional arrays, implementation of multi attribute data structures using array of structure.
- Implementation of stacks and queues.
- Conversion of expression from post fix to infix etc using stack.
- Implementation of single, double, circular link lists.
- Polynomial representation and manipulations.
- Sparse matrix representations .
- Implementation of AVL Trees.
- Sorting Algorithms-insertion, selection, bubble, quick, merge, heap sorts.
- Searching-Binary, depth first, breadth first.
- Index creation.

COURSE 31: SYSTEM PROGRAMMING :

Assembler: Algorithm of 1-pass and 2-pass assembler, data structure and implementation details, relocatable assemble etc. **Macro Processor:** Definition, Expansion, nested macro definition and call data

structure and implementation details, conditional macro. **Linker:** Definitions, public and external tables, linker algorithms, relocating and linking library. **Loaders:** Bootstrap loader. Absolute and relocating and linking library. **Loaders:** Bootstrap loader, Absolute and relocating loader, Implementation of absolute and relocatable loader etc. **Introduction to compilers:** Introductions, different phases and their working principles Editors, debuggers, memory resident programs. Viruses, practical example of linking and relocation of common operating systems.

COURSE 32: COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS :

Roots of equation: Iterative methods, bisection method, False position methods Newton-Raphson method, Solution of polynomial equations, solution of simultaneous equations, Gaussian eliminations, comparison of direct and iterative methods. **Interpolation:** Finite difference, polynomial interpolation. **Differentiation and integration:** Differentiation by polynomial fit. Trapezoidal and Simpson rules. Gaussian quadrature. **Numerical solution of differential Equations:** Solution by Taylor series. Euler's method. Predictor correction method, Runge-Kutta method. **Statistical Methods:** Sampling, frequency distribution, measure of central tendency and dispersion Moments, discrete Distributions, Binomial and Poisson distributions, Correlation coefficient, Overview of Simplex technique, test of significance – Chi square test, t-test and F-test.

COURSE 33: MICROPROCESSOR AND ASSEMBLY LANGUAGE :

Review of number systems: Binary decimal, octal, Hexadecimal, negative numbers representations, floating point representations. Basic of computer systems, introduction to CPU architecture. Interfacing devices: 8205, 8286 **Introduction to 8085:** CPU architecture, Register organization, instruction set, addressing modes. Machine cycle, timing diagram. Programming using 8085 instruction set. Interfacing memory, interfacing I/O – Memory mapped I/O, I/O mapped I/O . Interrupts, Introduction to DMA (with reference to 8085 CPU). Peripherals: Programmable IC – 8155, 8255, 8355, 8253 timer. Interfacing A/D & D/A converters. 8279 – keyboard/Display controller. 8259 – PIC. 5257 – DMAC, USART, Arithmetic processors. Microcontrollers 8096 microcontroller architecture typical application. Programming with assembly language, Simple assembly language programming using 8086

COURSE 34: DATABASE MANAGEMENT WITH ORACLE :

Basic concept database and database users, characteristics of database , database systems. Concepts & Architecture, Data models, schemes & Instances, Data independence, Data dictionary. A brief overview of three models Hierarchical model. Network model and relational model. Comparison of three models. Data modeling using E-R diagram. **Relational models:** Properties of relational model, concept of keys – candidate keys, primary key, alternate key, foreign key, integrity rules, Relational algebras – select, project, cross project, different types of joins, tuple relational calculus. **SQL:** A relational database language; view, queries in SQL, Constraints and indexes in SQL. **ORACLE:** ORACLE commands, creating tables, query generations, object oriented approach. file organization. client server ORACLE, ORACLE database administration, array, reporting tools SQL. PL/SQL commands. Application generation using front end tools. Database connectivities.

COURSE 35: OBJECT ORIENTED PROGRAMMING WITH C++ :

History of the development of object oriented programming languages. Basic concepts of OOP objects, classes, message passing. Notions of abstraction, encapsulation/ information hiding and modularity. instantiation and initialization of objects. Inheritance – single, multilevel, multiple and repeated, Runtime polymorphism, Difference between convention and object oriented programming, Advantages and disadvantages of OOP, class libraries. language feature of C++, Tokens, keywords, identifiers, variables, operators, expressions and control structures, functions and function prototyping , class, function overloading operator overloading, object constructor, inheritance, string manipulations in C++, Files in C++.

COURSE 36: LABORATORY III (PROGRAMMING USING C++):

1. Different problem solving using C++
2. matrix operations using C++
3. Solution of numerical problems under the course 32
3. Problems on data structures using C++
5. Solution of different problems using class concept
6. Problems on operator overloading in C++
7. Problems on polymorphism in C++
8. Problems in inheritance in C++
9. File operation (Read/Write) under C++
10. String manipulation in C++
11. Binary files in C++

COURSE 41: COMPUTER GRAPHICS:

Graphics Device: Concepts of raster scan and vector device, the video controller, Input output devices for operator interaction. **Point Plotting Techniques:** Simple algorithms for generating lines and circles. **Antialiasing.** **Polygon:** Algorithms for drawing and filling polygons. **Clipping:** Algorithms for clipping lines, circles and polygons. **2-d Transformations:** Matrix Representations, translation, Rotation, Scaling and reflection. **3-d Graphics:** Primitives 3-d transformations and perspectives Depth Cueing. **Curve and surfaces:** Shape Description requirements, Bezier curves, B-spline curves polygon meshes, Displaying curves and surfaces. **Hidden Surface Elimination:** Methods for hidden surface detection and elimination. Algorithms for Curves Surfaces. **Illumination and shading:** Basic illumination models, shading models and surface details, shadows, Transparency. **Colour:** Colour models for Raster Graphics. Application of Colour in Computer graphics. Essential of Computer Animation.

COURSE 42: VISUAL PROGRAMMING WITH VB:

Introduction to Visual programming: Integrated development environment – the menu bar, the tool bar, the tool box, the properties window, form designer, form layout, creating saving, editing, running the

project, Elements of user interface, programming basics in visual basics, visual development and event driven programming Customize the environment. **Visual Basic:** The language variable, constants, arrays, collections, procedures, function Return values, Control flow statements for loop, do loop, while loop, nested control structures. Working with forms appearance of forms, the start up forms, loading, showing and hiding forms, controlling one form within another. Design menus, programming menu commands, manipulating menus at runtime, building dynamic forms at runtime, drag and drop operation. **Basic Actives Control:** The text box control, list box and combo box control, searching a drop operation. Basic Active X Control: The text box control, list box and combo box control, searching a sorted list. The scroll bar and slider control. **Drawing with visual basics:** Graphics control, coordinates system, graphics methods drawing texts, drawing lines and shapes, filling shapes, using circle methods Manipulation colors and pixels with visual basic. **Database Programming with Visual Basics:** The data control, the data control properties, data control methods, understanding relational concepts the primary key, foreign key, using visual basics data managers, validating data, entering data accessing fields in records sets. An introduction to SQL, using SQL, statements, attaching queries to a database.

COURSE: 43 WINDOWS PROGRAMMING:

Introduction: how windows works, advantages of windows, running several programs simultaneously, structure of a window program, compiling a window program, window memory management, setting up systems, character sets, fonts. **Child and popup windows:** Creating a child window, fixed child window, popup window. **Menus:** Creating menus, menu loading box, using Microsoft dialog editor, exchanging data with dialog box, modal, modeless and system modal dialog boxes, defining string tables, user defined resources. **Managing Memory:** Local vs global memory, local memory blocks- passing handle to functions, using fixed memory blocks, changing size of Memory block, discardable memory blocks, global memory allocation. **Device Context:** Private device context, creating a device context, mapping modes, scalable mapping modes. **Printing:** Printer device contexts, scaling printer output, accessing the printer driver functions. **Disk File-Access:** Opening a disk file, reading and writing data closing a file, creating file selection dialog box. **Bitmaps:** How bitmap store images, loading a bitmap file, displaying a bitmap, bitmap data format, DIB format. **The clipboard:** Basics clipboard, clipboard format, clipboard limitation, using clipboard with an edit control. Dynamic Link Libraries.

COURSE 44: DATA COMMUNICATION AND COMPUTER NETWORKING:

Introduction: Goal and application of n/W, Computer N/W and distributed system. Review of transmission media characteristics, Data encoding and modulation techniques, Modem. The OSI model. **Data link controls:** Polling, Multiplexing, Flow control, Error control, Error detection and correction hamming and polynomial codes, HDLC. **Switched N/W:** Ckt, Msg and packet switching and congestion control. **Routing:** Adaptive and non-adaptive routing, board cast routing. Congestion control techniques. **Board cast N/W:** Medium access control strategies, Packet radio and satellite N/W. **LAN:** LAN topologies, Ethernet, Token Bus, Token Ring and FDDI Networks x .25. Queuing theory and delay analysis. **Internetworking:** Bridge, gateways and Routine x .75, TCP/IP, IP. addressing schemes, Routing on the Internet, ITP,SMTP ,Telnet and Rlogin Network security and authentication.

COURSE 45: LABORATORY IV (Windows Programming):

1. Write program to minimize and maximize icons, change the shape of the cursors. 2. Creating graphics images using rectangle(), moveto() and lineto() commands. 3. Writing different windows control programs, such as button, message. Option button. list boxes, combo boxes, scroll control etc. 4. Write program for different edit control. 5. Different mouse control programs. 6. Creating popup windows, add menu to pop up window. 7. menu loading programs, creating menus containing bitmaps. 8. Program to create different dialog boxes, Modless and system Modal dialog boxes. 9. Memory management programs. 10. Device management programs.

COURSE BCS 46: LABORATORY (VB & ORACLE):

1. Building different application programs using visual basics. 2. Building a calculator. 3. Program to create database and entering data to ORACLE from visual basics. 4. Programs to access data from ORACLE using visual basics. 5. Creating student enrollment programs. 6. Creating inventory programs for student database. 7. Results processing using VB-ORACLE. 8. Creating salary sheet using VB-ORACLE. 9. Income tax calculation using VB-ORACLE. 10. Savings bank transaction program using VB-ORACLE.

COURSE 51: OPTIMIZATION TECHNIQUES (OT):

Linear Programming: Graphical method for two dimensional problems – Central problem of linear programming various definitions – statements of basic theorem and properties simplex methods, primal and dual, dual simplex method, sensitivity analysis, transportation problem and its solution, assignment problem and its solution by Hungarian methods. **Integer programming:** Gomory cutting plane methods – Branch and Bound method. **Inventory Theory:** Costs involved in inventory problems – single item deterministic models – economic lot size models without shortages and with shortages having production rate infinite and finite.

COURSE 52: WEB TECHNOLOGY WITH JAVA:

HTML: requirement of using HTML, HTML editor, create, edit, modify, and run HTML documents. Creating Web page, page skeleton. Adding Visual structure, formatting text, paragraph, pages adding context variables, input, output, Basic styles, creating lists. Adding links, adding images to a web page, using image map for tables for tables for page layout, creating frames, creating HTML forms. Using a scripting language adding layers, dynamically changing the styles. Using CGI, parl. **Fundamentals of Java :** Data types, variables, arrays, operators, Inheritance, string Handling, Packages and interfaces Exception handling, Multithreaded Programming I/O, Applets, tagging applet in web pages Java Library Classes, The networking Classes and Interfaces.

COURSE 53: UNIX AND SHELL PROGRAMMING:

Introduction: Salient Features of UNIX, multi user, multi tasking capability, UNIX system Organization, types of shells Bourne shell, C shell, Korn Shell. UNIX Kernal Fundamentals. **UNIX File systems:** Creating files, listing files and directories, masking file permission, directory permission, Directory

related commands. The boot block, the super block, Incode table, data blocks, Disk related commands. Essential UNIX commands: I/O redirection and piping Editors Processes in UNIX, scheduling of processes. Communication under UNIX platform. **Shell Programming:** Fundamentals or shell programming, shell scripts, shell variable and keywords, positional parameters, passing command line arguments, arithmetic in shell scripts, control instruction in shells, if-then else statement, nested ifs, the case control structure, loop control structure – while loop, until loop, for loop, nesting of loops, Shell mathematics tackling multiple command line option. **System Administrations:** Adding removing users, system management, disk management, mounting file system, ensuring security of the system.

COURSE 54: SOFTWARE ENGINEERING:

Software Requirement and planning: Data flow diagram (DFD), Data dictionary, FRD cost estimation, Basic concepts on S/W quality. **Models:** Waterfall spiral, prototyping Fourth generation techniques, Software process, software requirement specifications (SRS). Fact finding techniques, characteristics of a good SRS. Verifiable, consistent, modifiable, traceable and usable during the operation and maintenance phase, prototype online of SRS. **Coding, Software Quality Assurance, Testing:** Software testing, different testing techniques, component testing system testing, test automation. Software project management (SPM), Software Matrix (SM), Software Maintenance

COURSE 55: LABORATORY VI (UNIX AND NETWORKING):

1. Writing programs using shell script for common problems. 2. Building different application programs using shell programming. 3. Creating student enrollment programs. 4. Creating inventory programs for student databases. 5. Result processing. 6. Creating salary sheet. 7. Income tax calculation. 8. Savings bank transaction program. 9. Networking of UNIX. 10. Creating mail accounts under UNIX.

COURSE 56 LABORATORY VII (JAVA AND INTERNET LAB):

1. Writing different HTML pages using HTML commands, 2. Creating Web pages. 3. Writing HTML documents for Basic styles, creating lists, Adding links, adding images to a Web page. 4. Program using image map for navigation, 5. Program for creating frames, creating HTML forms. 6. Programs for creating tables of data. 7. Creating dynamic web pages. 8. Solution of different common problems using JAVA. 9. Solution of different problems using arrays. 10. Writing programs for inheritance, polymorphism, operator overloading. 11. Writing program for multithreading handling. 12. Applet programming and tagging of applet in HTML document.

DETAILED SYLLABUS OF BCA MANAGEMENT ORIENTED ELECTIVE PAPER

ELECTIVE 1a. DIGITAL IMAGE PROCESSING:

Image: Digital representation, elements of visual perception, sampling and quantization, image processing system elements. **Fourier transforms:** Extension to 2D, DCT, Walsh, Hundred transform

Enhancement and segmentations, smoothing, sharpening, Thresholding Edge detection, segmentation, point and region dependent techniques. **Image encoding:** Fidelity criteria, transform compression KL, Fourier, DCT, Spatial Compression, Run length Encoding Huffman and contour encoding. **Restoration:** Models, Inverse filtering, least square filtering recursive filtering

ELECTIVE 1b. ADVANCED DBMS :

Recapitulation of introductory part: Definition of database, integrated database, Architecture of database. Data independence, Basic database system terminology. Physical data organization. Entity Relationship model, different database management techniques. **Database protection:** Crash recovery, security, Integrity – Referential integrity and Foreign key. Relational Query languages. Query Optimization. Concurrent operation on the database. **Distributed Database:** Distributed DBMS features and needs, Reference architecture, Levels of distribution transparency, distributed database design – fragmentation, allocation criteria, storage mechanism. Tightly vs. Loosely compelled system, Centralized vs. Distributed deadlock, object- entity model. **Concurrency control:** 2 phase lock, Dead lock handling, distributed deadlock, time based and quorum based protocols, partitioned networks, checkpoints and cold stars, Clients server database. Basic concepts on multi-media database

ELECTIVE 1c. AI AND EXPERT SYSTEMS:

Introduction to Intelligence: Features of Intelligence, Artificial Intelligence (AI) techniques – state space. Representation problems. Depth first, breadth first and Best First search problem characterization. **Heuristic Search:** Different Heuristic Techniques – performance Measure of Heuristic Search. Knowledge Representation Methodologies – Predicate and propositional Logic Resolution - Knowledge Representation Using Rules – Logic programming – AI Languages – Symbolic Reasoning Under Uncertainty-Semantic Net and Frame – Game Tree – Alpha and Beta cut off's – planning Different Planning Techniques –Learning – different Learning Techniques – Experts Systems (ES) – Components of ES Techniques of knowledge Acquisition in ES – ES shell – Neural Networks – Hop field Networks – Single and Multi layer. Perception – learning and Back Propagation – supervised, Reinforcement and unsupervised Learning – case studies: MYCIN, RI.

ELECTIVE 2a. COMPILER CONSTRUCTION:

Introduction to compiler – Bootstrapping a compiler – various phases of a compiler – lexical analyzer. Deterministic and non- deterministic finite automata – syntax analysis- parsing – Ambiguity in grammar. Bottom-up (shift reduce) parsing – top down (recursive decent) parsing – operator precedence parsing. Predictive parser and LL (1) grammar – LR (0) parser – SLR (LR(0)), LR (1) and LALR parser. Intermediate code generation – Quadruples, three address code and triples for expressions and control. Statements – Error detection and recovery – syntactic and semantic error – Error recovery in LR, LL and operator precedence parser – code optimization – Logical and global optimization – Code generation – Run time and storage management – Code generation algorithm.

ELECTIVE 2b INTERNET AND TCP/IP PROGRAMMING:

The X.25 networks and supports protocols: features of X.25, layers of X.25 and the physical layer, X.25 and the data link layer, companion standards to X.25, features of X.25, X.25 channel options, flow control principles. X.25 logical channel states, packet formats, internetworking, connectionless mode networks, the frame relay and X.25 stacks. **TCP/IP:** TCP/IP and internetworking, examples of TCP/IP operations, related protocols ports and sockets. The IP address structure, major feature of IP, IP datagram, major IP services, IP source routing, value of the support layer, TCP, major features of TCP, passive and active operation, the transmission control block (TCB), rout discovery protocols, examples of rout discovery protocols, application layers protocols. The silent server Model, Socket Overview and reserved Socked, proxy server, Internet Addressing, Domain naming services (DNS), TCP/IP client sockets, URL connection Datagram server and client security.

ELECTIVE 2c. SIMULATION AND MODELING:

Role of Modeling in systems analysis: computer simulation of stochastic systems, generation of pseudorandom numbers and stochastic varieties using Computer program, Simulation of queuing systems, using special purpose languages for simulating queuing systems, GPSS and SLAM; system dynamic of systems with feedback; using DYNAMO in system dynamics, case on situation on production, finance, marketing and corporate planning.

ELECTIVE 3a. FINANCIAL ACCOUNTING:

Financial Accounting-nature and scope. generally accepted accounting principles and accounting standard in India. Introduction to Ledger account, Trial Balance profit & Loss Account and balance sheet Financial statements analysis. Inventory valuation, concept of cost capital. Application of Computers in accounting, Computer based accounting system

ELECTIVE 3b. MANAGERIAL ECONOMICS:

Nature and scope of managerial Economics, objective of the firm, managerial and behavioral theories of the firm. Concept of opportunity cost, incremental, time perspective, principles of discounting and equimargins. Demand analysis purpose and concepts. Elasticity of demand. methods of demand forecasting. Product and cost analysis: short run and long run average cost curves. law of supply, economics and diseconomics of scale, law of variable proportions. Production function – single output isoquants. pricing prescriptive approach, price determination under perfect competition monopoly, oligopoly and monopolistics competition, full cost pricing, product line pricing and pricing strategies. Profits: Nature and measurement policy, breakeven analysis, case study.

ELECTIVE 3c. HUMAN RESOURCE MANAGEMENT:

HRM- Definition, importance, objectives and scope. Recruitment and selection – objective, methods, pre-requisites, advantages and disadvantage of different methods of test of interviews. Induction – objective of induction programs, methods. Training and development – training need and methods, identification of development need – role of HRM problems in HRM. Motivation – Theories and methods. Performance application needs, problem, methods, merits and demerits of methods HRM culture and eliminate. Organizing for HRM. Morale and productivity – definition, function, steps in improving morale.