Syllabus for BCA (M U Bodh Gaya)

The course in BCA (Hons.) shall be of three academic sessions divided into eight papers (2 + 2 +4) of honours subject and seven papers (3 +3 +1) of subsidiary or general subjects including compulsory subject in degree I, II & III respectively, each paper carry 100 marks.

Provided to have declared pass a student securing 60% and above shall be placed in First class and atleast 45% marks and below 60 % in Hons. in aggregate shall be placed in the second class. In subsidiary and general paper a student must secure atleast 33% marks in each paper.

The report of PROJECT WORK are required to be submitted in typed and binded Hard copy and Soft copy (CD) in triplicate. The Project Report will be examined separately by three examiners - Two Externals and one Internal - Who will also conduct Viva -Voce examination at the centre.

HONOURS COURSE STRUCTURE :

1.	**Degree Part - I**	**MARKS**
	Vernacular Composition	100
	OR	
	(Alternative Eng. /Mother tongue + Hindi Composition - 50 + 50)	
	Two Honours Papers	200
	Two Subsidiary papers	200
	(From Art/Science/Commerce subjects as the case may be)	
	Total	**500**
2.	**Degree Part - II**	
	Vernacular Composition	100
	OR	
	(Alternative Eng. /Mother tongue + Hindi Composition - 50 + 50)	
	Two Honours Papers	200
	Two Subsidiary papers	200
	(From Art/Science/Commerce subjects as the case may be)	
	Total	**500**
3.	**Degree Part - III**	
	Four Honours Papers	400
	General Studies	100

(Pass marks for General Studies will be 33)

	Total	**500**

	Grand Total	**1500**

COURSES OF STUDIES
BACHELOR OF COMPUTER APPLICATIONS (HONOURS) [BCA (HONS.)]

1. Degree Part - I   **Full Mark**

Paper - I -   Computer Fundamentals &   **100**
                     Introduction to Computer Architecture   **(Th. 75, Pr. 25)**

Paper - II -   Operating Systems & Business Applications.   **100**
                                                                                      (Th. 75, Pr. 25)

2. Degree Part - II

Paper - III   Computer Networking & Structured Programming   **100**
                                                                                      (Th. 75, Pr. 25)

Paper - IV   Data Structure & Computer Aided Drafting   **100**
                                                                                      (Th. 75, Pr. 25)

3. Degree Part - III

Paper -V   Programming in Visual Basic and   **100**
                   Database Management System -I & II   **(Th. 75, Pr. 25)**

Paper - VI   Object Oriented Programming (C++ & Java)   **100**
                     & Advance Topics in computers.   **(Th. 75, Pr. 25)**

Paper- VII   Practical on Development of Business
                     Applicationsin RDBMS. Programming in   **100**
                     C++ & JAVA

Paper - VIII   Project Report & Viva -Voce   **100**

COMPULSORY SUBJECTS   **Full Marks**

✯   **Vernacular Composition (Degree I & II)**

       Alternative English / Mother Tongue   **50**

       Hindi Composition   **50**

                    Or

       Hindi Composition   **100**

✯   **Subsidiary Papers (Degree I & II)**

       Any Two from the Options

       (Physics, Economics, Mathematics, Functional English)   **200**

DETAIL SYLLABUS OF BCA [HONS.] COURSE
MAGADH UNIVERSITY, BODH-GAYA
BACHELOR OF COMPUTER APPLICATIONS
BCA (Hons.)
Degree Part -I

PAPER - I

Full Marks - 100   **(Theory -75, Practical - 25)**

COMPUTER FUNDAMENTALS

Introduction to computers : What is Computer ? Comparison between computer and human brain, Characteristics of Computer, Computer applications.

History of Computers : Initial development, Generation of Computer, Evolution of Personal Computers.

Computer Organisation : Basic units of computer, Block diagram of Computer, Input Unit, Processing Unit, Output Unit, Storage Unit.

Types of Printers : Hard Copy output, Impact Printers, Non-Impact Printers, Serial and Line Printers, Dot-Matrix Printers, Laser Printers, Daisy wheel printers, Drum and Chain Printers, Thermal Printers.

External storage devices : SASD, DASD, Punch Cards, Magnetic Tapes, Blocking utilization factor, Magnetic Disk, Tracks, Sectors, Seek Time, Rotational latency, Access time, Numerical problems.

Type of Computers : Digital, Analog, Hybrid Computers, General purpose Computers, Turnkey Systems, Micro Computers, Mini Computers, Mainframes, Super Computers.

Data Representation : Number systems, Binary System, Binary to decimal and Decimal to Binary Conversion, Binary addition, 2's compliment representation, Binary substraction, **ASCII** and **EBCDIC** coding.

Computer Software : Machine language, Assembly language, High level languages, Compilers, Interpreters, Assemblers.
Centralised Processing, Decentralised Processing, Distributed Processing, Management Information System.

Processing modes : Uniprocessor, Multiprocessor, Batch Processing, Off Line Data Entry, On-line processing, On-line data entry, Real time processing, Time Sharing Processing , Electronic Mail, Tele text, Tele Conferencing.

Programming Concepts : Programme definition, Characteristics of good programme, Programming Steps, algorithms, Flow Charts.

INTRODUCTION TO COMPUTER ARCHITECTURE
Introduction to microprocessors and associated components, Timer, Display Controllers, DMA controllers.

Block diagram of IBM PC, Evolution of microprocessor, Family of Intel microprocessor, Introduction to 8086 & 8088 architecture.

Functional description of various modules & Cards, CISC & RISC Technology, Various types of displays and other peripherals used in IBM PCs.

Boot process in IBM PC. System Files, Self text

Disk Operating System - Introduction. File Management, Directory Structure in DOS. Internal and External commands of DOS, Batch files, Configuration files, System files, COM, BIN, SYS, EXE & TXT files.

Programming Logic & Design Techniques :
Programme development, Low-level Programming language, high-level languages, Programming logic, programming techniques, programming Tools, programme maintenance. Techniques of programming (Algorithm, flowchart, pseudocodes). Introduction to programming in QBASIC, structured programming - Introduction, Need of structured programming Development of programs in QBASIC.

PRACTICAL

Visit to Computer Lab. Introduction to various components of computer. A simple documentation preparation & printing. Usage of printer & other components.

Use of External & Internal DOS Commands. Programming in QBASIC.

Physical inspection of IBM PC and internal cards. Introduction to nomenclature (COM1, COM2 etc.) Writing batch files for various purposes. Modify config.sys files, Creating using QBASIC programmes.

Reference Books:

1.	Fundamentals of Computer	P. K. Sinha
2.	Computers fundamentals	B.Ram
3.	Computer Architecture (Schaum's outline)	CARTER, TMH
4	IBM PC and Clones: Hardware Troubleshooting and maintenance	Govindarajalu, TMH
5.	How to solve it by computer	Dromy, PHI

PAPER — II

Full Marks 100   **(Theory -75, Practical-25)**

OPERATING SYSTEMS

Introduction to various categories of softwares. Operating System and its function interaction of operating System with hardware and user programme., various components of operating system with reference to DOS, BIOS, BIOS and DOS interrupts. Single User operating system, Task loader, Memory management., Device Management. Control of various devices . Device drivers interrupts driven and poll driven data transfers . Need of software & Hardware protocols., Multi User , Multi Tasking, Multi processing and Real time operating system,. Introduction to memory management Techniques., File systems, File management,Process management and scheduling., Special requirements and facilities for multiprocessing environment., Examples of multiprocessing operating systems. Introduction to UNIX. User management in UNIX .

Computers in office automation : Nature and uses of information, Formal and Informal information and communication,Gathering and presenting Informations, system life cycle, Documentation, Testing, Debugging, Impementation

BUSINESS APPLICATIONS

Database organisation, Data base files, records , fields, Types of files in database.

File organisation **:** Sequential file, Random file, Indexed file, Foxpro, MS- Office, Windows 98/2000.

FOXPRO :

VIEWING AND EDITING DATA

Foxpro - version, features requirements of hardware and software; Foxpro - Menu System; Creating database file , operation of database(create, list, append, close, quit); Foxpro - data type.; Data displaying and monitoring commands : DISPLAY, LIST, LOCATE, EDIT, CHANGE, BROWSE, REPLACE, DELETE, RECALL, PACK, (all commands with varrious options.); File Utilities in Foxpro- DISPLAY DIRECTORY, COPY, DELETE, RENAME.

INDEXING, SORTING AND PRINTING REPORT

Indexing concept and sorting;   Sort Commands - Single & Multiple Key; Advantages and disadvantages of sort; Indexing Vs sorting & multiple Key; Indexing, FIND, SEEK, Rushmore Technology; Foxpro Report - its creation, feature & Utilities, Preview, Printing custom Report, grouping and sub grouping.;   Foxpro Level - Designing and Printing.

MEMORY VARIABLE, KEYBOARD MACROS AND FUNCTION

Memory variables- creation and uses, simple vs array; Saving and restoring memory variables; ? / ?? / ??? commands; Time & date functions and commands, date arithmetic; Converting defining function keys.;   Keyboard Macros-creating and using; Arithmetic operations, Mathematical Functions, mathematical commands,statistical functions

PROGRAMMING AND ERROR DEBUGGING :

Concepts of foxpro commands files, modify commands; Conditioning, branching and looping within programme file with Do-While, Enddo, if-Endif, Scan- Endscan, For- Endfor, Docase-Endcase, Text-   Endtext, Executing commands from other command files, Macro   subtitution;Common Error Message; Debugging techniques and commands.

MULTIPLE DATA FILE AND CUSTOM SCREENS :

Concepts of multiple Database file, Using multiple database - SET RELATION, UPDATE, APPEND FROM, COPY TO, JOIN, Relation Query by Example.; Create custom screen with @, @_GET, @_Edit, @ say_GET_READ, creating Box and Line, User define functions, custom screen designing and there uses, FoxDoc for documentation.

PRACTICAL

Development of a batch files to install software from floppy to disk.

Development of a batch files to manage various packages on the disk.

Detection of viruses and protection packages on IBM PC. MS-Office,Windows 98 / 2000.

Text & Reference Books:

1.   Foxpro for windows   R. K.Taxali   BPB Publications
2.   Foxpro made simple   R. K. Taxali, BPB
3.   MASTERING FOXPRO 2.5   BPB Publication
4.   Operating System Concepts   Galvin,PeterBeier, Addison Wesley Publication
                                        Abrahm Sltberschatz
5   Microsoft Office-2000   Sagman, Pearson Education India.

BCA HONS. - IInd Year

PAPER - III

Full Marks - 100   **(Theory -75, Practical - 25)**

COMPUTER NETWORKING

Introduction to the N/W, Network Topologies, Types of channels : Twisted Wire, Co-axial wire, Microwave Communication, Setellite Communication, Optical fibre, Simplex, Duplex, Half Duplex Communication. Switching Techniques,Circuit Switching, Massage Switching, Packet Switching, FEP, Repeaters, Bridge, Gateway, Token passing CS / CD, Protocols, ISO-OSI Model, NIC, Serial and Parallel Communications.

INTERNET

Evolution, Protocols, Interface concept, Internet Vs Intranet, Growth of Internet, ISP, Connectivity-Dial-Up, Leased Line, VSAT,etc URLs, Domain Names, Portals, Application. E-mail Concept, POP and Web Based E-Mail, address, Basics of sending and receiving, E-Mail protocols, Mailing list, Free E-mail Services.

BOOLEAN ALGEBRA

Boolean Algebra, Rules and Theorems, De'Morgan Theorem, Duality Principal, Logical gates, Canonical equations, K-Maps, Half Adder, encoder, decoder.

STRUCTURED PROGRAMING

Methods of Documentation. Methods of analyzing program requirement. Data flow diagrams.

C- LANGUAGE

Unit 1 : Overview of C ; Introduction & features of C; Structure of C Program; Variables, Expressions, Identifiers, Keywords, Data types, Constants, Operators and Expressions; Operator : Arithmetic, logical, Relational,Conditional, and Bitwise operators; Precedence and Associativity of operators;Type Conversion in Expression.

Unit II : Basic Input /Output and Library Functions; Single character Input / Output , i.e. getch ( ), getchar ( ), getche ( ), Putchar ( ); Formated Input / Output, i.e.printf ( ) and scanf ( );Library functions- Concepts, Mathematical and character functions; Control structure; If statements, If-Else Statements, Nesting of If-Else statements, else if ladder;   The ? : Operator; goto Statement; Switch statement; Compound statement; Loop Controls; for, while, do-while loops; break, Continue, goto statement.

Unit - III : Single and Multi Dimensional Arrays;Array declaration and initialisation of Arrays;   Strings : declaration, initialisation, functions.

Unit - IV : Functions; The need and form of c functions; Userdefined and Library functions; Functions arguments; Return values and nesting of function; Recursion; Calling of functions;Array as function argument;Scope and life of variable- local and global variable; Storage class specifier auto, extern, static, register.

Unit - V : Structure and Union; Defining structure; Declaration of structure variable; Accessing structure member; nested structure; Array of structure; Structure Assignment;Structure as function argument; Union.

Unit - VI : Basic of Pointers, Operators, Pointers and function; Passing array to function; array pointers; Pointers strings;Pointers to Structure;Pointers Within Structure.

Unit - VII : Dynamic Memory Allocation;   The Process of memory allocation;   malloc ( ) operator;   size of () operator;   function calloc ( );   function fee ( );   function realloc ( )

Unit - VIII: File handling: file structure; file handling function; file type; streams; text; Binary; file pointer; opening file and closing file; writing and reading a character; using fopen ( ), etc( ), putc( ) & fclose( ); using feof ( ); working with string fputs & fgets; flushing stream; Fusing fread ( ), fwrite ( ) & rewrite ( ); direct access file.

Unit - IX : Preprocessor Directive & Commands, The Preprocessor; #define; defining like macos;#error; #include;conditional compilation directive i.e #if, #else, #elif and #iddef & #undef; #line;

Unit - X : Direct access color graphics; Initialise graphics mode; function used in graphics;   Bitwise operator.

Unit - XI : Screen Control; Creation of windows; text attributes control; extended keywords code; menu design; word processing.

Practical

Programing in C language and Project development

Text & Referances Books

1	Pointer through	C. Y. Kanitkar
2	LetUs C	Y.Kanitkar
3	Programing in C -	E. Balaguruswami
4	Computer Networks	S.Jain,BPB
5	Computer Networks	Tanenbaum,PHI
6.	Computer Networking With Internet Protocol	Stallings,Pearson Education

Full Marks - 100   **(Theory -75, Practical 25)**

Data Structure

Introduction to data structure : concept of data structure; Abstract data structure; Analysis of Algorithm;   The concept of List

Stack and Queues: Intoduction to stack & primitive operation on stack; Stack as an abstract data type; Multiple stack; Stack application : infix, postfix, prefix and recursion; Introduction to queues;   Primitive operation on the queues; Queues as an abstract data type;Circular Queue; Dequeue;   Priority queue.

Linked List: Introduction to the linked list of stack; The linked list of Queue; Header nodes; Doubly Linked List; Circular Linked List;Stack & Queue as a circular linked list; Application of Linked list

Trees : Basic Terminology; Binary Tree;The Tree representation as Array & Linked List; Binary Tree representation; Traversal of Binary tree : Inorder, Preorder & Post order; Application of Binary Tree; Threaded Binary Tree; B- Tree & Height Balanced Tree, representation of B+ & B* trees Binary tree representation of trees; Counting Binary trees

Searching and sorting : Sequential Searching; Binary Search; Insertion Sort;Selection Sort; Quick sort; Bubble Sort; Radix Sort; Heap Sort; Merge Sort; Comparison of Sorting methods.

Tables and graphs : Hash Table; Collision resolution Technique; Introduction to Graphs; Definition; Terminology; Directed, Undirected & Weighted Graph; Representation of Graphs; Graph Traversal -Depth First & Breadth First Search;   spanning   Tree,   Minimum spanning Tree; The Basic Greedy strategy for computing Algorithm of Kruskal and Prims

COMPUTER AIDED DRAFTING

Introduction to AUTOCAD / ROBOCAD or similar package. Advanced features of these Packages. Drawing plan of a building using AUTOCAD etc. Analysis feature of AUTOCAD

Practical

Design of layout of a building. Design of Interior of its rooms. Printing and plotting the prepared drawings. Fashion designing through AutoCAD.

Text & Referances Books

1	Data Structure through C	Kanitkar,BPB
2	Fundamentals of Data Structure :	By S. Sahni & Horowitch
3	Data Structure :	Tannenbaum
4	AutoCad 2000 -	
	The Complete Reference	COHN,TMH

BCA HONS. - III YEAR

PAPER - V

Full Marks - 100   **(Theory - 100)**

PROGRAMMING IN VISUAL BASIC

The Integrated Developmentt Environment of Visual Basic: Menu Bar, Tool Bar, Project Explorer, Tool Box, The Properties Window; The Form Designer Immediate window; Edit View, Run, Debug, Options; Using the application Wizard

Maping Project : Concept of VB Project; Creating the Project; Opening, Renaming and Saving the Projects.

Elements of the user interface: Designing the user interface; Creating forms and code modules; Aligning; Running the application Programming an application; Programming the Command buttons; Grouping controls;

Visual Development and event - deriven programming : Common Properties; Methods and common Properties.

Customising the environment: Editor tab, Format tab, General tab, Docking tab, Environment tab

Introduction to Visual Basic Language

Variable: Declaring variable type of variable, converting variable type; User defined data type; Special values; A variable's scope.

Constant: Arrays; Collections; Procedures, subroutines, functions, arguments; Control flow statement and conditional statements; Loop statements;   Iteration

Working with forms : Loading; Showing and Hiding forms; Controlling one form within another; Using form templates;   Menus; Designing menus; Programing menu commands; Using access and shortcut keys; Mapping menus at runtime;Mouse conflicts, dragging list items using message boxes and input dialogs; Using standard modules instead of form modules.

Active X Commands

The text box control: Basic properties ; Manipulating the control's text; Text Selection; Search and replace operations; Capturing Key strokes;

List box and combo box controls: Basic properties; The List box controls methods, arrows; Indexing with the list box control; Searching as sort list.

The scroll box and slider control: Scroll bar control; scroll bar control's event.

Dialog box: Using the common dialog controls; Collor common dilog box; font dialog box; The file open ; and file commn dialog box; Print dialog box; Help dialog box; File controls; The built Active X controls.

Component of Visual Basic : Classes, Intances, objects; Encapsulation and abstraction; Derived classes and base classess, class in;Dynamic Binding,Creating object, variables form as a classes; Creating manipulating routine controls the object browser;Object Linking and Embeding

Graphics with Visual Basic : Form, Picture box and image box controls sizing image loading and saving images; Exchanging image through the clipboard; Coordinate systems, scale properties and methods; The drawing methods, drawing text, drawing boxes filling; Drawing curves, manipulating pixels, specifying colors,specifying gradients; Event deriven programing, Multiple document interface (MDI); Interface with Visual Basic and Windows API; Dynamic Link Liabraries; Programing and interfacing with Office.

DATABASE MANAGEMENT SYSTEM - I

Categorisation of DBMS systems. Network, Hierarchical and Relational database. Application of DBMS system. Entity relationship charts. Relational database Management systems (RDBMS). Why to use them and where. Data manipulation language (DML) and Data control Language(DCL). Security consideration in DBMS, performance improvement in databases.

DATA BASE MANAGEMENT SYSTEM - II

Relational database - Advance concepts, Introduction to ORACLE / INGRESS or a similar RDBMS on a multi user environment. Structure Query Language (SQL). Form design on an advanced RDBMS. Report generation. Query by Example (QBE)and Report by form. Accessing RDBMS Using management. Security consideration.

Text & Referances Books

1	Learn Microsoft Visual Basic 6.0 Now	by Halvorson PHI, pub.
2.	Visual Basic 6.2 2nd ed.	by Rahmel TMH, pub.
3.	Database system concept	by Korth, PHI, pub.
4.	Schaum's outline series :	
	Fundamentals of Relational Databases	by TOLEDO, TMcH
5.	Oracle 9i PL/SQL programming	by URMAN, TMcH

PAPER - VI

Full Marks - 100   **(Theory - 100)**

OBJECT ORIENTED PROGRAMMING

Introduction to object oriented programming & C++, Objects, Polimorphism, Inheritence, C++ fundamentals, Classes and objects , Function overloading, Operator overloading, Constructor and Destructor, Multiple inheritances , Passing object to functions, Array of objects , Pointer to object, C++ I /O class library, C++ stream, C++ predefined streams, C++ stream classes

JAVA PROGRAMMING

Overviw of Java Language :   Java program Structure, Tokens, Java virtual machine, constant & variables, data types, declaration of variables, scope of variables, symbolic constants, type casting Operators : Arithmetic, relational, logical assignment, increment and decrement, conditional, bitwise, special, expression and its evaluation , Decision making and branching If statement, If.. else statment, Nesting of If.. else statements, else.. If ladder, switch ? operator, loops. while, do, for, jumping loops, labeled loops.

Clasess, Object, methods: Defining class, adding varriable and methods, creating object, accessing class members, constructor, methods of overloading, static members, nesting of methods Inheritance: extending a class, overloading methods, final variable and methods, final classes, finalizer methods, abstract methods and classes, visibility control, Array, string and vectors, Array : one dimentional, Two dimenstional strings, vectors, wrapper classes, defining interfaces, extending interfaces, implementing interfaces, accessing interfaces, Multi threaded programming, Creating threads, extending the threads classs stoping and blocking a thread, life cycle of thread, using thread method, thread exception, thread priority, sychronisation, implementing the runnable interface

Applet programming: Local and remote applets, applet Vs application writing applets, designing a webpage, applet tag, adding applet to html, running the applet, passing, parametres to applet, aligning, the display.

ADVANCE TOPICS IN COMPUTERS

Introduction to : Computer animation, Artificial intelligence, Dedicated computers, ATM, Data encryption, Data communication and Networking (Course to be modified every year to take care of latest development.) Visit to a computer industry.

Text & Referances Books

1	C++ : The Complete Reference 4/ed.	SCHILDT, TMcH
2.	Object oriented programming with C++ 2/ed.	Balagurusamy TMcH, pub.
3.	Object oriented programming in Java	Gilbert, Techmedia
4.	The Java Programming Language,3/ed.	Arnold, Pearson Education
5.	Introduction to AI Robotics	Murphy, PHI
6.	ATM Networks (Concepts and Protocols)	Kasera, TMcH

PAPER - VII
Full Marks - 100   (Practical - 100)

Design of a database for a business application. Design of a data entry forms and reports layouts for this databases. Creation of programmes to access and manipulation of the databases.
Development of a business application in RDBMS.
creating, merging, deleting tables

PAPER - VIII
Full Marks - 100   (Project - 100)

Prepare a Project in C++ Programming.
Project Preparation & Viva - Voce