Director's Message

The global position of India in the field of higher education lies after USA and China. In higher education, industries, and various companies, we need personnel with education in IT and Computer Applications. Medical transcription, Network administration, Management of System Architect Technology, Software development/ System analysis, Software engineering, Multimedia designing, Web development, Security Auditor, teaching and training are some of important areas where a student with BCA degree and interest can find a satisfying job. In this perspective of development and job opportunities, the three year degree course, Bachelor of Computer Applications (BCA), was started in our college in 2003 as vocational course under Magadh University regulations. It is being conducted in the Department of Computer Applications (Science Building). Since then it is ever climbing new heights in imparting education, job orientation and character building.

We impart knowledge not only to pass university examination with good marks but also provide you basic stuff for career building. The college is equipped with a team of experienced experts to design, plan and implement this course with highest academic quality and skills, and caters to student diversity as per government and university policies, so that students may successfully complete their courses of study and attain their esteemed goals.

I wish our students and supporting members laurels after laurels in their lives.

Prof. (Dr.) Indrajit Prasad Roy

Principal / Director
Bachelor of Computer Application (BCA)
College of Commerce, Arts & Science, Patna-20

The Bachelor of Computer Applications (BCA) course offered by Patliputra University is a three Year Honours Degree vocational course and recognized by U.G.C. It imparts professional education in IT field and promising avenues for latest advances and techniques. A student with a quality degree of BCA (Hon's) may find a job satisfaction at this level, or go for higher studies like Management, MCA and doctoral courses available at various institutions. MCA course is already running in our college.

To keep abreast of the field, the syllabi of BCA (Hon's) and MCA courses are updated and focused on the emerging pattern of demand. The mission is to deliver knowledge of latest technology through advanced courses as per Patliputra University regulations and government policies. I would like to thank our principal-cum-director, faculties and students for their continued support and active participation.

Wishing shining peaks of prosperous laureateship,

Prof. A. K. Bhaskar

Co-ordinator
Bachelor of Computer Application (BCA)
College of Commerce, Arts & Science, Patna-20

About Patliputra University

Patliputra University, Patna was established on **18th March, 2018,** by the order of the Government of Bihar, vide Letter/memo no. 15/M1-71/2016-700, dated 09.04.2018. All the colleges of Patna and Nalanda districts, Bihar (India), fall under the jurisdiction of the Patliputra University except those attached to the Patna University. The University has control over 25 constituent colleges, two government girls colleges, three minority colleges and a number of affiliated colleges. Many of these colleges are running university-approved post-graduate centres in various subjects besides skill-oriented courses in vocational and technical/professional areas. These affiliated units are governed by their governing local bodies and duly constituted management board approved by the university.

The Headquarter of Patliputra University is in Patna having its present address as "Old Bypass Road, Kankarbagh, Patna-8000 20, Bihar (India)."

The University has set avant-grade International standards in Teaching-Learning and Research with the aid of uniquely conceived innovative approaches that are aimed to propel the quality of higher education to a new height in the country. The ambience of the university is being developed with radical ideas having global perspective in the domain of Education. The students in our colleges are from different corners of the state/region. In order to achieve academic excellence, we are striving to create a student-centric atmosphere that would be sensibly conducive to all stakeholders-viz-students, researchers, academicians, teachers, parents, society, institutions, research organisations, industries, govt. agencies and all kinds of employers. The university aspires to collaborate with several national and international academic bodies, research organisations, universities, industries, govt. agencies and non-government organisations.

In order to facilitate job-oriented degree programmes, the university has introduced several degree programmes, such as

1. M.B.A. (Commerce)
2. M.Sc (Bio-Tech)
3. MLIS
4. MCA
5. B.Sc (IT)(Technical Bhawan)
6. BLIS
7. B.C.A.
8. B.B.M. (Commerce)

The College of Commerce, Arts & Science : An Introduction

It was established in the year 1949 with only commerce course in the beginning, and hence its name was **College of Commerce**. In 1952, the college was affiliated to Bihar University; Application teaching was started in 1957 followed by Arts, Science in the Year 1960 and Law in 1963. Later the college became a constituent unit of Magadh University Bodh Gaya. Post Graduate Centres started here in 1984. The college is one of the oldest and widely acclaimed institutions in the field of education recognized under U.G.C. regulations. It has produced a number of scholars and has always imparting to its students terminal. In 2016, it becames name is **College of Commerce, Arts & Science, Patna.**

The College is located in Patna at Kankarbagh, just opposite to the Rajendra Nagar Terminal and is well connected by the city's transportation system. Transport for any part of the city is easily available to and from the college. Students coming from suburbs by local train find it very convenient to reach the college by coming to Rajendra Nagar Terminal. Almost all local trains have their stoppage at this station. It is about 10 kilometers by road from Jai Prakash Narayan International Air Port, Patna.

The College has larger campus area and has sufficient buildings and various departments inside the campus. Central Bank of India (with ATM), Post-Office and Police Monitoring are available inside the college campus to provide multiple facilities and security inside the college. Various kinds of scientific, cultural and Youth programmes are also colorfully conducted in the college.

Currently, the college is imparting undergraduate and postgraduate education to students in many subjects of Arts, Science, and Commerce with adequate infrastructure including well furnished lab, Library, and spacious classrooms, along with Vocational Courses like Computer Applications, Biotechnology, Bio-Chemistry, Office Management, Functional English, etc. The college offers environment for all round development of its students. Recently the college has gone technical savvy and has launched its own website on Internet and Wi-Fi facility. The web address of the college, **http:/www.cocaspatna.org**, provides general information about the college and the courses offered by it.

Bachelor of Computer Applications (BCA)

The Department of BCA was started in the year 2003 under the able Directorship of Dr. S.P. Sinha, the principal of the college. The department is located in the Science building of the College on the first floor and it has a total carpet area of about 5000 sq feet Inside the building. The expansion of the department is taking place at the second floor of the same building. There are more than 15 staff members in the department including around 10-12 teaching staff with some guest faculties and 3 non-teaching staff members. The teaching staff includes professionals and highly qualified people from different subjects to conduct theory and practical classes of students. The department has a large number of sophisticated and advanced Computer systems. Peripheral includes printers like Dot Matrix to Lasers, Projector, Laptop, Scanners, Web Camera and CD-Writer etc. Advanced training equipments like video projector and Computer based training materials (CBTS) in Compact Disks forms are available. The Department has an un-interrupted power supply through UPS, ensuring a proper power supply during practical classes. The air conditioned computer laboratory can accommodate a total number 60 students at a time and is well equipped.

Our Co-ordinator	Our Director (Principal)
Dr. Kumar Rajeev Ranjan (Jun 2003-Dec 2010)	Dr. Suresh Pd. Sinha
Dr. Kamdeo Prasad Yadav (Jan 2011-Feb 15, 2015)	Dr. Subhash Pd. Sinha
Dr. Bidhan Chandra Rai (Feb 16, 2015-...............)	Dr. N. Tiwari (In-charge)
Prof. A. K. Bhaskar	Dr. P. K. Verma
	Dr. Shailendra Kr. Singh (In-charge)
	Prof. (Dr.) Baban Singh
	Prof. (Dr.) Tapan Kamar Shandilya
	Prof. (Dr.) Indrajit Prasad Roy

Bachelor of Computer Applications (BCA)

Admission Procedure

The candidates wishing for admission are requested to submit their online application the official website of Patliputra University. www.ppu.ac.in prescribed application form cost as per the norms of the university.

Reservation Policy

As per norms of Bihar Govt. Bihar.

Fee Structure

As per guide lines of Patliputra University, Patna and college administration which is subject to change.

Medium of Instruction

The medium of instructions will be English & Hindi, but emphasis will be on English. The institute will provide regular workshops to improve English of enrolled students.

Documents required for admission in Patliputra University's regular courses.

☞ Photocopy for 10th board Provision Certificate (Date of Birth)

☞ Photocopy of 10th board Mark Sheet.

☞ Photocopy of 10+2 or Intermediate Passing Certificate.

☞ Original Mark Sheet of 10+2 or Intermediate Board Exam.

☞ Original college Leaving Certificate or School Leaving Certificate.

☞ Original Migration Certificate (Not for Intermediate Council student)

☞ Cast Certificate with category declared if the applicant belongs to SC, ST or OBC (annexure I and II)

☞ Number of recent passport Size Photographs-5

Note : All the photocopies of submitted documents have to be attested by a gazetted Officer/Notary.

Attendance Compulsion

Each & every student of Regular Course must register minimum 75% attendance in classes. No student with less than 75% attendance will be allowed to write/ appear in University Examinations, as per the rules.

Library

The College provides facilities of Library to each & every student and avail Library Membership till the end of his course.

Bachelor of Computer Applications (BCA)

Team Work & Project Assignments

Being professional degree course, the students will be assigned different topics related to their subjects which they will have to do as team-work or project assignment.

Guest Lectures, Seminars & Video Shows

The institute will invite industry leaders and experts to deliver lectures time to time. This would give the students a chance to listen and share the practical experiences of experts. The institute will arrange educational seminars, in which the participation of experts and the students will be actively invited. The institute has a wide range of educational video cassettes & CDs. These cassettes will be displayed in order to develop the knowledge level of enrolled students. The schedule of the show will be placed on notice board.

Examinations & Final Results

For Regular programmes, Patliputra University, Patna is the sole authority to conduct Examinations. The college as well as the student will follow the rules & regulations, schedule and other informations given by the University.

Interaction with the Industry and Seminar

In each semester/year working professional from the Industry will share their thought and experience with the students to make them understand the needs and practices followed in the industry.

Seminars for each student will be conducted at the end of the year to develop the communication skills.

Opportunities

The BCA (Hon's) course, which is designed by team of experts, will make a student well versed in Computer Applications and Technologies, so that he or she could get a job in any public or private sector, companies, government offices, industry, teaching and training. For students who want to pursue further studies, the course will help them build a solid platform for Management, MCA and other courses.

SYLLABUS
As per guidelines of the UGC/Patliputra University (Hons.) Paper

HONS.-First Year

PAPER-I

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

Group-1
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 Computer.

Computer Organization : Basic Units of comptuer, 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.

Types 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 subtraction, ASCII and EBCDI Ccoding.

Computer Software : Machine language, Assembly language, High level languages, Compilers, Interpreters, Assemblers. Centralized processing, Decentralized 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, Flowcharts.

Group-2
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.

Group-3
PROGRAMMING LOGIC AND DESIGNTECHNIQUES

❖ Programme development, low-level programming language, high-level languages, programming aids, programming techniques, Programming tools, Program Maintenance.

❖ Techniques of programming (Algorithm, flowchart, pseudo codes). Introduction to programming in QBASIC structured Programming - Introduction. Need of structured programming Development of programme in QBASIC.

Group-4
PRACTICAL

❖ Visit to computer lab : Introduction to various components of a computer. A simple documentation preparation and printing. Usage of printer and other components.

❖ Use of External and 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 uusing QBASIC programmes.

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

Group-1

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 and hardware protocols.
- ❖ Multi-user, Multi tasking, multi processing and real time operating system. Introduction tomemory 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 Informationand Communication, Gathering and Presenting Information.
- ❖ System life cycle, documentation, testing, debugging, Implementation

Group-2

BUSINESS APPLICATIONS

- ❖ Database organization, Database files, records, fields, types of files in database.
- ❖ File organization : Sequential file, Random file, Indexed file, Windows 98 / 2000, MS-Office.

Group-3

PROGRAMMING WITH FOXPRO

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 withvarious options)
- ❖ File utilities in FoxPro- display directory, copy delete, rename

FOXPRO : 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 & sub grouping.
- ❖ Foxpro level-designing and printing

FOXPRO : Memory variables. 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
  Arithmetic operations, Mathematical functions, mathematical Commands, Statistical Functions

PROGRAMMING AND ERROR DEBUGGING :

- ❖ Concept of FoxPro commands file, 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:

- ❖ Concept of Multiple Database File, Using multiple database-SET RELATION, UPDATE, APPEND FROM, COPY TO, JOIN, Relation Query by example.
- ❖ Concept of Multiple Database File, Using multiple database-SET RELATION, PDATE, APPEND FROM, COPY TO JOIN, Relation Query by example.
- ❖ Create custom screen with @, @_GET, @EDIT, @SAY_GET_READ, Creating Box & Line, User define functions, Custom Screen Designing and their uses, FoxDoc for Documentation

- ❖ Text & References:
- ❖ FOXPRO made Simple: by R. K. Taxali, BPB
- ❖ MASTERING FOXPRO 2.5 BPB Publication

Group-4
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.

HONS.- Second Year
PAPER-III

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

Group-1
COMPUTER FUNDAMENTALS

- ❖ Introduction to the N/W, Network Topologies, Types of channels : Twisted Wire, Co-axial wire, Microwave Communication, Satellite Communication, Optical fiber, Simplex, Duplex, Half Duplex Communication, Switching Techniques: Circuit Switching, Message 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 Email services.

BOOLEAN ALGEBRA

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

STRUCTURED PROGRAMMING

- ❖ Methods of documentation. Methods of analyzing a program requirement. Data flow diagrams.

C-LANGUAGE
Unit I

- ❖ 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 Associatively of Operators,
- ❖ Type Conversion in Expression

Unit II

- ❖ Basic Input/Output and Library Functions
- ❖ Single character input/output, i.e. getch (), getchar (), getche(), putchar()
- ❖ Formatted input/outputi.e.printf() and scanf()
- ❖ Library functions concepts, Mathematical & Character functions.
- ❖ Control Structure
- ❖ If statements, If-Else statements, Nesting of If-Else Statements, else if ladder
- ❖ The?: Operator goto statement

Unit-III

- ❖ Singleand Multi Dimensional arrays
- ❖ Array declaration and initialization of Arrays
- ❖ Strings : declaration, initialisation, functions.

Unit-IV

- ❖ Functions, The need and form of C functions, Userdefined and library functions, Function 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 arrays to function, array pointers, pointers strings, pointers to structure, pointers within structure

Unit-VII

- ❖ Dynamic Memory Allocation, the process ofmemory allocation, malloc () operator, size of ()operator, function calloc(),function fee(), function reailoc()

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(), getc(), putc().& fclose ().using feof(), working with string fputs() & fgetsj), flushing stream, using fread(), fwrite(), & rewrite(), direct access file.

Unit-IX

❖ Preprocessor Directive & Commands, the Preprocessor, #define, defining like macros, #error, #include, conditional compilation directive i.e, #if, #else, #elif and #ifdef & #undef # line

Text & References Books

❖ Pointor Thourgh C.Y. Kanitkar TSR through C.Y. Kanitkar Programing in C.E. Balaguru swami

❖ Programming in C language and project development.

PAPER-IV

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
❖ Introduction to stacks 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
❖ 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
❖ Applications of Linked List

Trees

❖ Basic Terminology
❖ Binary Tree
❖ The Tree representation as Array & Linked List
❖ Binary tree representation
❖ Traversal of Binary tree; In order, 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, Shell Sort, Heap 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 a Algorithm of Kruskal and Prims

Text & References Books

❖ Fundamentals of Data Structure: By S. Sawhney & Horowith
❖ Data Structure: R. B. Patel
❖ Data Structure: Tannenbaum

COMPUTER AIDED DRAFTING

❖ Introduction to AutoCAD / RoboCAD or similar package. Advanced features of these packages. Drawing plan of a building using AutoCAD etc. Anatysis 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.

PAPER-V

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

Group-1

PROGRAMMING IN VISUAL BASIC

- ❖ The Integrated Development 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
- ❖ Mapping 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-driven programming

- ❖ Common Properties
- ❖ Mothods and common properties

Customizing the Environment

- ❖ Editor tab, format tab, general tab, docking environment tab

Introduction to Visual Basic Lang Variable

Variable

- ❖ Declaring variable type of variable converting v type, user define data type, special values, variable declarations, a variable's scope

Constant

- ❖ Arrays, collections, procedures, subroutines, fur arguments, control flow statement and conditional statements, looping statements, iteration

Working with forms

- ❖ Loading
- ❖ Showing and hiding forms
- ❖ Controlling one form within another

- ❖ Using form templates
- ❖ Menus
- ❖ Designing menu
- ❖ Programming 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 from 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 controls
- ❖ 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
- ❖ Color common dialog box
- ❖ Font dialog box
- ❖ The filer open and file common dialog box
- ❖ Print dialog box
- ❖ Help dialog box
- ❖ File controls
- ❖ The built Active X controls

Component of Visual Basic

- ❖ Classes, instances, objects
- ❖ Encapsulation and abstraction
- ❖ Derived classes and base classes, classes in Dynamic Binding, creating object, variables forms as a classes
- ❖ Creating manipulating runtime controls the object browser
- ❖ Object linking and embedding
- ❖ Graphics with Visul 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 driven programming, Multiple document interface (MDI)
- ❖ Interface with Visual Basic And Windows API
- ❖ Dynamic Link-Libraries
- ❖ Programming and interfacing with office

DATABASE MANAGEMENT SYSTEM I

- ❖ Categorization 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.

DATABASE MANAGEMENT SYSTEM II

- ❖ Relational Database advance concepts. Introduction to ORACLE/INGRESS or a similar RDBMS on a multi user environment.
- ❖ Structured Query Language (SQL). Form design on an advanced RDBMS. Report generation. Query by example (OBE) and Report by form. Accessing RDBMS using management. Security consideration.

PAPER-VI

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

OBJECT ORIENTED PROGRAMMING

- ❖ Introduction to object oriented programming & C++
- ❖ Objects, Polymorphism, Inheritance, C++ Fundamentals, Classes and Objects, Function overloading. Operator overloading, Constructors & Destructors, Multiple inheritances, Passing objects to functions, Array of objects, Pointers to object, C++ V/O class library, C++ Stream,C++ Predefined Streams, C++ Stream classes

JAVA PROGRAMMING

Over View of Java Lang.

- ❖ 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, il, else statement, nesting of if..elsestatements, else. it ladder, switch? operator, loops, while, do, for, jumping loops, labeled loops

Classes, object, methods

- ❖ Defining class, adding variable and methods, creating object, accessing class members, constructor, methods of overloading, static members, nesting of methods
- ❖ Inheritance: extending a class, overriding methods, final variable and methods, final classes, finalize methods, abstract methods and classes, visibility control
- ❖ Array, String and vectors
- ❖ Array: one dimensional, two dimensional strings, vectors, wrapper classes, defining interfaces, extending interfaces, implementing interfaces, accessing interfaces,
- ❖ Multithreaded Programming
- ❖ Creating threads, extending the threads classs topping and blocking a thread, life cycle of thread, using thread methods, thread exception, thread priority, synchronization, implementing the runnable interface

Applet programming

- ❖ Local and remote applets, applets vs application writing applets, applets, applets life cycle, creating and executable applets, designing a Web page, applet tag, adding applet to html, running the applet, passing, parameters to, applets, 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.

PAPER-VII

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

- ❖ Design of a database for a business application. Design of data entry forms and reports layouts for this databases. Creation of programmes toaccess and manipulation of the databases.

- ❖ Development of a business application in RDBMS.
- ❖ Creating, merging, deleting tables.
- ❖ Project Preparation & Viva-Voce

PAPER VIII

Full Marks-100   **(Project-100)**

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

Subsidiary

FIRST YEAR

ENGLISH

- ❖ ◆ Julius Caesar (William Shakespeare)
  - ◆ New Polgrave's Treasury (Poetry),
  - ◆ Love (Gorge Herbert),
  - ◆ On His Bindness (John Mittonb).
  - ◆ Ode To a Nightingale (John Keats)
  - ◆ Arms and the Man (George Gemard Show), A Little Leaming (A.Pope), The World Too Much With Us (William Shakespeare), Break Break Break (A.L. Tennyson)

ECONOMICS

- ❖ Micro & Macro Economics, Utility analysis Law of Demand, Elasticity of demand, Consumer's Surplus. Lavs of profit, Principles of population, Cost Analysis. Perfect competition & Monopoly & Price determination. National fncome, Social Accounting & Principles Of distributor. Rent, Interest, Wages, Profit Planning, Functions of money, in Economics. Principles of Quantitative of Money 4 Principles of savings cost Waiton- consequence. Causes, Remedies, Commercial & Central Bank: functions, I.M.F. & World Bank : Functions, Law of Taxation, Profits, Salaries, Ability & Principles. Causes of Public Expenditure : Consequence & Cases, International Trade, Comparative Cost Principle of International Trade. Free Trade & Production.

Hindi (100 Marks)

हिन्दी रचना पद्य एवं गद्य	–	80 अंक
हिन्दी व्याकरण	–	15 अंक
वाक्य संशोधन मुहावरे लोकोक्तियाँ	–	5 अंक

निर्धारित पाठ्य ग्रंथ– काव्य के सोपान स्व० डॉ० लक्ष्मण प्रसाद सिन्हा अथवा सरल हिन्दी

काव्य– स्व० डॉ० नेपाल नाथ मिश्र 'ख' कथाअंजली– स्व० डॉ० सत्येन्द्र नारायण शर्मा, निर्धारित कहानियों, उससे कहा था, सच का सौदा, मूर्ख क्रोधा, सुभान खाँ, संबंधा सती। अथवा, कथा कथ राम विनोद सिंह 'ग' सप्तरंगिनी स्व० डॉ० दिवाकर अथवा गद्य के रूप डॉ० वंशीधर लाल, लिंग, वचन, कारक, काल संधि समास, उपसर्ग, प्रत्यय !

MATH

Group A :

- ❖ **Set Theory Abstract Algebra :** Notation of Sets and Their Algebra, Cartesian Product, Relation and Mapping and Their Classification Equivalence Relation and Partition of Sets, Countable Sets, Countable Sets.
- ❖ **Abstract Algebra :** Binary Operations, Notions of Group, Sub Group Cyclic Group and Permutation Group Elementary Concepts of Ring, integral domain and field with examples.

Group B :

- ❖ **Matrices and its Algebra Kinds of Matrices** (Unitary, matrix, Hermition Matrix) transporse adjoint, Inverse and orthogonal Matrices, Notations of Rank of Matrix.
- ❖ **Linear Programming :** Convex sets and their properties LPP Problem and their Graphical Solution, Theory of Simplex Method and Applications.

Group C :

- ❖ **Trigonometry and Real analysis :** DeMoivre's theorem and its Applications. Complex arguments and Hyperbolic functions Gregory series.
- ❖ **Real Analysis :** Sequence and their convegence Cauchy's General Principle of convergence, Convergence & Divergent series of the Positive terms, compaison test, Cauchy's root test, D'Almbets Test, Alternation series, Continuity and differentiability.

Group D :

- ❖ **Co-ordinate Geometry two dimensions :** System of circles, Radical Access, Co-axial Xircles. The Parabola, The Blips, The Hyperbola, Conies. Analytical.

Group E :

- ❖ **Geometry of three dimensions :** Relations and Notations between two straight lines, equations of planes and straight line condition for complantaity of straight lines. The shortest distance between two lines. Sphere.

ENGLISH

❖ **An Anthology of English Prose :** National Prejudice-Goldsmith, Dofinition of Gentleman New man, Knowledge and Wisdom C. Russel, On being a Bore-R Lynd, does Cultural matter? Foster, The scientific point of View- Haldane, National Education-Gandhi, The Variety and Unity of India Nehru. Representative Short Stories: The case oa Amontill ado-Poe, The gift of the Magihenry, Mr. Know All-Maugham, The Dolls Mans field, A Raja Rao Animal Farm-George Orwell, Essay, Grammar (Common error : Idioms and phrases, Pair of world tens sequence.

ECONOMICS

❖ **Planning Types of Planning :** Capialism, Socialism, & Mixed Economic Planning. Characteristics of Indian Economic- Poverty. Unemployment & Their measures. Population- forms & Development, population policy. Natural Resources Forest Policy, Energy Policy. Agriculture Cause to dawn fall & measures. Land improvement-limitation of ploughing, determination, joint farming, Chakbandi Co-operative farming. Agriculture-credit, Co-operative & Commercial Bank, Rural bank (NABARD) New scenario of agriculture development green revolution. Industrial Policy. 1956,1977,1980, Large Industry-Iron, Cement, Sugar & Jute. Small Scale Industry-Necessity & Problems. Foreign trade of India forms & Constructive. Indian five year plan special reference in seventh five year plan 9 book: Economic Planning & Indian Economic system : L.M. Ram, Indian Economy: Rudasadatt & Sundaram.

MATHS

❖ **Differentials Calculus (3 Question) :** Successive Differentiation, Lebinitz's theorem, Taylor's series and maclaurin's series, Partial derivatives Euler's theorem, Indeterminate forms, Equation of Tangents and normals Asymptotes, Formulae of radiuso Curvature in different co-ordinates system, Maxima and Minima of functions of single variable.

❖ **Integral Calculus (3 Question) :** Indefinite, Intergralm Definite Integral, Properties of Definite Integration, Integration by summation method. Reduction formula. Rectification and quadrature with simple examples, Volume and surface of solid of revolution, Moment of Inertia, Simple use of double and triple intergration and Gamma and Beta Function.

❖ **Differential equation (3 Question) :** Differential equation of 1st order and 1st degree. Separation of variables, Homogenous equations of first order and higher degree, Clairaut's form Linear differential equations of second with constant co-efficients, Orthogonol trajectories.

❖ **Vector analysis (3 Questions) :** Classification of Vectors Triple Products. Differentiation of a Vector functions, differentiation of a product of two vectors, Gradient of a sealer, Divergence and Curl of a vector in Cartesian co-ordinates.

❖ **Mechanics (2 Questions) :** Coplanar forces system, Necessary and sufficient condition for equilibrium of a particle, necessary condition for a system a particle to be in equilibrium. Reduction of a general plane force system, Equation of the line Basic concepts of mechanics. Basic laws of mechanics. Inertial frames of reference, work and energy, principles of linear momentum, angular momentum and energy for a particle, conservation field and potential energy, principle of conservation of energy for a particle. Rectilinear motion :- Uniformly accelerated motion (Including connected system) Resistem motion, Harmonic Oscillate damped and force vibrations, Elastic Springs and strings, Hook's law vertical and horizontal vibrations of a article attached to an elastic strings, Hook law's vertical and horizontal vibrations of a particle attached to an elastie string.

❖ **Motion in a plane (2 Questions) :** Components of velocity and acceleration, Cartesian radial and transverse, Tangential and normal.

Hindi (100 Marks)

पाठ्य–पुस्तकों से आलोचनात्मक प्रश्न (ग+प) – 80 अंक

पाठ्य पुस्तकें से व्याख्या निबन्ध – 20 अंक

निर्धारित पाठ्य पुस्तक : यशोधारा मैथिलीशरण गुप्त अथवा कुरूक्षेत्र रामधारी सिंह दिनकर, कथा सरित स्व० डॉ० लक्ष्मण प्रसाद सिन्हा, घर जमाई, पुरस्कार, पढ़ेगा, अमीचन्द्र, करवा का व्रत 'चौथ' विष के दाँत, हंसा जाई अकेला अथवा कुंज स्व० डॉ० हरिहर नाथ, मुफ्त का यश, वह क्षण, परदा अच्छे आदमी, नागफाॅस, अपरिचित नौ पर्दें, स्व० डॉ० विनोद सिंह, नया पुराना, रीढ़ की हड्डी, सड़क, परणागत, रात बीतने तक, शाहजहाँ के आँसू अथवा एकांकी कुन्ज स्व० डॉ० उमेश चन्द्र मिश्र, ताम्ये के कीड़े, दो कलाकार, शिवाजी का सच्चा स्वरूप, माँ, सुखी डाली, शेरशाह।

FACULTIES

The service of the following faculties/Guest faculties are availed by the department to provide excellent education in the field of Computers.

GUEST FACULTY MEMBERS

Dr. Rajkishore Prasad	:	Principal, B. N. College, P.U., Patna. Ex Faculty Member
Dr. Sushil Kr. Singh	:	Associate Prof. (Retd.) P.G. Centre, Dept. of Physics, COCAS, Patna-20
Mrs. V. Kusum	:	Lba, DCPA (Aryabhatt)
Mr. R. K. Sinha	:	Lecturer, L.N.M. Institute of Business Management, Patna
Dr. A. Narayan	:	Prof. (Retd.) Dept. of Physics, Patna University, Patna
Prof. Shrikant Singh	:	Prof., P.G. Centre of Hindi COCAS, Patna
Prof. Saloni Kumar	:	Prof., P.G. Centre of English, COCAS, Patna-20

FACULTY MEMBERS

Prof. (Dr.) Indrajit Prasad Roy	:	Director (B.C.A.) College of Commerce, Patna-20
Prof. A. K. Bhaskar	:	Co-ordinator B.C.A. & Professor of Physics, COCAS, Patna-20
Himanshu Ojha (Course-Incharge)	:	M.C.A.
Manoj Kumar Yadav	:	M. Sc. (Maths)
Amitesh Kumar	:	M.C.A.
Kurshid Alam	:	M.Sc. (IT)
Shailesh Kumar	:	M.C.A.
Sanjeev Kumar Sinha	:	M.C.A.
Anil Kumar	:	M. Sc. (Maths)

NON-TEACHING STAFF

Nitish Kumar	Assistant
Rudra Pratap	DEO
Amit Kumar	Office Boy