

2.6.1 Teachers and students are aware of the stated programme and course outcomes of the programmes offered by the institution.



LPCPS
LUCKNOW PUBLIC COLLEGE
OF PROFESSIONAL STUDIES

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BACHELOR OF COMPUTER APPLICATION (BCA)

(SESSION 2023-2024)

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BACHELOR OF COMPUTER APPLICATION (BCA) (THREE YEAR PROGRAMME)

After Completing Bachelors in Computer Applications (BCA) students are able to improve their fundamental computer literacy, their basic understanding of operative systems and a working knowledge of software commonly used in academic and professional environment by using word processor, spreadsheet and other application software. Students will also develop skills to present ideas effectively and efficiently through professional presentations - Designing and delivering an effective presentation and developing the various IT skills to electronic databases. Student can use the Systems Analysis Design paradigm to critically analyze a problem and solve problems (programming networking database and Web design) in the Information Technology environment. Function effectively on teams to accomplish a common goal. BCA program enables student Develop IT oriented security issues and protocols and make them able to design a web page.

Programme Outcomes (PO):

- To develop skilled and professionally motivated technocrats, equipped with critical reasoning and ethical values that fosters scientific temperament with a sense of social responsibility.
- To produce knowledgeable and competent human resources who are employable in all walks of life.
- To create, identify and implement appropriate techniques, resources, and modern engineering and IT tools.
- To impart expertise required for planning, designing and building complex software systems as well as provide support to automated systems.
- To build caliber in the students to tackle both personal and social challenges and improve the quality of life.


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Program Specific Outcomes (PSO):

- Ability to acquire knowledge in various fields of computer science, and to apply in industry, entrepreneurship and/or higher studies, for a thriving career.
- Understanding to incorporate knowledge of computing and technological advances appropriate to the program.
- Ability to develop software systems to enable the convenient use of the computing system and possess technical credentials.
- Ability to exercise the principles of management and strategic concepts required for teamwork as well as team management.

Syllabus

Paper Code	Subject List
Semester-1	
NBCA-101	FUNDAMENTALS OF COMPUTER AND IT'S APPLICATIONS
NBCA-102	PROGRAMMING IN C
NBCA-103	BASICS OF INFORMATION SYSTEM
NBCA-104	MATHEMATICS
NBCA-105	SOFT SKILLS AND PERSONALITY DEVELOPMENT
NBCA-106P	COMPUTER APPLICATION LAB
NBCA-107P	PROGRAMMING IN C LAB
NBCA-108P	PROFESSIONAL COMMUNICATION LAB
Semester-2	
NBCA-201	DATA STRUCTURE
NBCA-202	DATABASE MANAGEMENT SYSTEM
NBCA-203	OPERATING SYSTEM
NBCA-204	DISCRETE MATHEMATICS STRUCTURES
NBCA-205	DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION
NBCA-206P	DATA STRUCTURE LAB
NBCA-207P	DBMS
Semester-3	


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 Lucknow Public College of Professional Studies
 Vinamra Khand, Gomtinagar, Lucknow

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BCA301	COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUE
BCA302	OBJECT ORIENTED PROGRAMMING USING JAVA
BCA303	OPERATING SYSTEM
BCA304	MANAGEMENT INFORMATION SYSTEM
BCA305	COMPUTER ARCHITECTURE
BCA306P	COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUE LAB
BCA307P	OBJECT ORIENTED PROGRAMMING USING JAVA LAB
BCA308P	OPERATING SYSTEM LAB
Semester-4	
BCA-401	DISCRETE MATHEMATICS
BCA-402	BUSINESS ECONOMICS
BCA-403	COMPUTER GRAPHICS AND MULTIMEDIA SYSTEM
BCA-404	DATABASE MANAGEMENT SYSTEM
BCA-405	SOFTWARE ENGINEERING
BCA-406P	COMPUTER GRAPHICS AND MULTIMEDIA SYSTEM LAB
BCA-407P	DATABASE MANAGEMENT SYSTEM LAB
BCA-408P	SOFTWARE ENGINEERING LAB
Semester-5	
BCA-501	DATA COMMUNICATION AND COMPUTER NETWORK
BCA-502	DESIGN AND ANALYSIS OF ALGORITHM
BCA-503	WEB DESIGN CONCEPT
BCA-504	UNIX AND SHELL PROGRAMMING
BCA-5051	ELECTIVE PAPER 1-DATA MINING AND WAREHOUSING
BCA-5052	ELECTIVE PAPER 2: SOFTWARE TESTING METHODOLOGY
BCA-5053	ELECTIVE PAPER 3: OPEN SOURCE SOFTWARE
BCA-5054	ELECTIVE PAPER 4: INFORMATION SYSTEM: ANALYSIS, DESIGN & IMPLEMENTATION
BCA-506P	UNIX AND SHELL PROGRAMMING LAB
BCA-507P	WEB DESIGN LAB
BCA-508P	VIVA VOCE ON SUMMER TRAINING
Semester-6	
BCA-601	E-COMMERCE
BCA-602	CYBER LAW AND INTERNET SECURITY
BCA-603	MOBILE COMPUTING
BCA-6041	ELECTIVE PAPER 1: OPTIMIZATION TECHNIQUE
BCA-6042	ELECTIVE PAPER 2: MICROPROCESSOR
BCA-6043	ELECTIVE PAPER 3: DATA COMPRESSION
BCA-6044	ELECTIVE PAPER 4: CRYPTOGRAPHY

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BCA-605P | ADVANCED TECHNOLOGY (DOTNET LAB)

COURSE OUTCOMES (COs)

SEMESTER I

THEORY

FUNDAMENTALS OF COMPUTER AND IT'S APPLICATIONS

NBCA-101

- Understand the components. Characteristics and limitations of the computer system.
- Understand the different types of input devices, output devices and their advantages and disadvantages.
- Understand the various types of storage devices and their storage capacities.
- Understand the concept of number system.
- Understand the computer software need and types of software.

THEORY

PROGRAMMING IN C

NBCA-102

- Understand about writing, compiling and executing a program in C language.
- Learn the fundamental building blocks of C Language like constants, variables, identifiers, operators and type conversion.
- To write programs in C-language that involves decisions and iterations
- Understand the implementation of functions, arrays and pointers in C programming language.

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THEORY

BASICS OF INFORMATION SYSTEM

NBCA-103

- Understand fundamentals of information system.
- Visualize structure of management information system and decision support system.
- Learn various business application of information system.
- Explore ERP, supply chain management and CRM based information System.

THEORY

MATHEMATICS

NBCA-104

- Use matrices, determinants and techniques for solving systems of linear equations in the different areas of linear Algebra, Solve eigen value problems and apply Cayley Hamilton Theorem.
- Study the functions of more than one independent variable and calculate partial derivatives along with their applications
- Understand and implement the concept of differential equations and learn various methods to solve ordinary differential equations.
- Identify a range of techniques to form the partial differential equations(PDF) and solutions of standard linear PDFs.
- Compute and interpret the results of Bivariate Regression and Correlation Analysis.

THEORY

SOFT SKILLS AND PERSONALITY DEVELOPMENT

NBCA-105

- Understand Personality and Personality aspects.
- Be able to communicate professionally.

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- Be able to put forward own view point and create a professional and profitable pitch.
- Be able to communicate across organizational levels and cultures effectively.
- Be able to negotiate with the odds and bring in best of the results with specific success.
- Understand the need for feedback and constant improvement.

PRACTICAL

COMPUTER APPLICATION LAB:

NBCA-106P

- To understand the concept of program and its development procedure.
- To understand the concept of algorithms and Flowcharts for solving problems
- To understand the use of the C programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general.
- Introduces the more advanced features of the C language

PRACTICAL

PROGRAMMING IN C LAB:

NBCA-107P

- Recognize and understand the syntax and construction of C programming code
- Know the steps involved in compiling, linking and debugging C code.
- Write the C code for a given algorithm.
- Understand using header files
- Acquire logical thinking, Implement the algorithms and analyze their complexity, Identify the correct and efficient ways of solving problems
- Read, understand and trace the execution of programs written in C language.
- Learn the methods of iteration or looping and branching

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- Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.
- Develop conditional & iterative statements to write C program
- Understand proper use of user defined functions
- Implement real time applications using the power of C language features.

PRACTICAL

PROFESSIONAL COMMUNICATION LAB:

NBCA-108P

- To learn the basics of English grammar
- To learn to create sentences in English and basic techniques for appearing the GD and Interviews.
- To learn basics of letter writing
- To learn to write different types of applications and report writing techniques.

SEMESTER II

THEORY

DATA STRUCTURE

NBCA-201

- Learn how to represent arrays, linked lists, stacks queues in memory using the algorithms and their common applications.
- Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.
- Learn the computational efficiency of the sorting and searching algorithms.
- Learn implementation of Trees and Graphs, and various operations on these data structures.
- Identify the alternative implementations of data structures with respect to its performance to solve a real-world problem.

THEORY

DATABASE MANAGEMENT SYSTEM

NBCA-202

- Understand database concepts, structures and query language.
- Understand the E R model and relational model.

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- Design and build a simple database system and demonstrate competence with the Fundamental tasks involved with modeling, designing and implementing a DBMS.
- Understand concept of transaction processing and concurrency control.

THEORY

OPERATING SYSTEM

NBCA-203

- Analyze various process scheduling Algorithms and their comparisons.
- Understand the Process synchronization problems.
- Implement the concept of deadlock detection and avoidance.
- Compare and contrast various Memory management schemes and Page replacement policies.
- Understand the concept of File and Disk management.

THEORY

DISCRETE MATHEMATICAL STRUCTURES

NBCA-204

- Apply logical skills developed in this course, in various computer applications.
- Apply the computing skills to formulate, solve and analyse interdisciplinary real-world problems for higher study and research.
- Apply various algebraic structures in different branches of computer science
- Apply Graph theoretical concepts to modal, analyse and solve real-world problems.

THEORY

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION:

NBCA-205

- Design various logic gates and simplify Boolean Functions.
- Design various flip flops, shift registers and determining outputs.
- Analyze, design and implement combinational logic circuits.
- Perform computer arithmetic operations

2.6.1 Teachers and students are aware of the stated programme and course outcomes of the programmes offered by the institution.

- Understand the Control Unit, memory design and I/O organization of computer system.

PRACTICAL

DATA STRUCTURE LAB:

NBCA-206P

- Be able to design and analyze the time and space efficiency of the data structure.
- Be capable to identify the appropriate data structure for given problem.
- Have practical knowledge on the applications of data structures.

PRACTICAL

DBMS:

BCA-207P

PRACTICAL

NBCA-208P

OPERATING SYSTEM LAB

SEMESTER III

THEORY

COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES:

2.6.1 Teachers and students are aware of the stated programme and course outcomes of the programmes offered by the institution.

BCA-301

- On completion of Course the student will be able to get Familiar with calculation and interpretation of errors in numerical method. The numerical methods to find out solution of transcendental & algebraic equations using different methods under different conditions. Methods to find solution of simultaneous equations by various methods
- On completion of Course the student will be able to get understands the concepts of finite differences. Gains knowledge about to interpolation for equal & unequal intervals .Relationship between different operators.
- On completion of Course the student will be able to get numerical Integration by trapezoidal & Simpson's rule. Distinguish methods of Taylor series, Euler's, Modified Euler's and RungeKutta methods to find solutions of differential equations.
- On completion of Course the student will be able to get various methods involved for Testing the hypothesis

THEORY

OBJECT ORIENTED PROGRAMMING USING JAVA:

BCA-302

- Upon completion of this course, students should be able to understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements. The concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
- Upon completion of this course, students should be able to identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Able to use class and proper class protection mechanism to provide security.
- Ability to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Demonstrate the ability to use simple data structures like arrays in a Java program. To demonstrate the ability to understand and use Exception handling and file handling mechanism. Arrange the concrete and abstract classes in an appropriate hierarchy.

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- Explain the fundamental concepts and features of Java Programming language. Use and create Packages and Interfaces in a Java program Implements the Multithreading concepts

THEORY

OPERATING SYSTEM:

BCA-303

- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

THEORY

MANAGEMENT INFORMATION SYSTEM:

BCA-304

- Students would be able to understand the usage of MIS in organizations and the constituents of the MIS.
- The student would understand the classifications of MIS, understanding of functional MIS and the different functionalities of these MIS. This would be followed by case study on Knowledge management.
- This module leads to linking MIS to business strategy and the areas in which MIS would lead to strategic advantage. This would be followed by case study and guest lecture.
- The student learns the functions and issues at each stage of system development. Further different ways in which systems can be developed are also learnt.
- This module provides understanding about emerging MIS technologies like ERP, CRM, SCM and trends in enterprise applications.

THEORY

COMPUTER ARCHITECTURE:

BCA-305

2.6.1 Teachers and students are aware of the stated programme and course outcomes of the programmes offered by the institution.

- The student should understand the major architectural styles and appreciate the compromises that they encapsulate.
- They should be able to read outline descriptions of real processors and understand in which way their designs fit into the frameworks described in the course.
- They should also be able to understand the impact of design choices in programming in the context of a specific architecture.

PRACTICAL

COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUE LAB:

BCA-306P

- Modeling a system or situation (using technology, if appropriate) in order to solve the problems using multiple approaches.
- Implementing the logic for finding the roots of transcendental equation using C Language.
- Implementing the logic for developing the C program for equal & unequal Interpolation methods.
- Implementing the logic for numerical Integration in C language
- Judge if the results are reasonable, and then interpret and clearly communicate the results

PRACTICAL

OBJECT ORIENTED PROGRAMMING JAVA LAB:

BCA-307P

- Implement Object Oriented programming concepts using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
- Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem.
- Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
- Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.

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PRACTICAL

OPERATING SYSTEM LAB:

BCA-308P

- To make students able to implement CPU scheduling algorithms (like FCFS, RR, SJF, Priority) and Bankers algorithm used for deadlock avoidance and prevention.
- Students will also be able to implement page replacement (like FIFO, LRU, and Optimal) and memory management algorithms (like Sequential, Indexed, Linked File Allocation and Paging Memory Technique).

SEMESTER IV

THEORY

DISCRETE MATHEMATICS:

BCA-401

- Be able to reason at multiple levels of detail and abstraction, being aware, in particular, of the applicability and limitations of tools from mathematics and theoretical computer science.
- Recognize the context in which a computer system may function, including its interactions with people and the physical world.
- Able to communicate with, and learn from, experts from different domains throughout their careers.
- Possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves.
- To be able to manage their own career development and advancement.

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- Manage their own learning and development, including managing time, priorities, and progress.
- Have developed interpersonal communication skills as part of their project experience.
- Work effectively both individually and as members of teams.
- Make effective presentations to a wide range of audiences about technical problems and their solutions.
- Encompass an appreciation of the interplay between theory and practice.

THEORY

BUSINESS ECONOMICS:

BCA-402

- Develop an understanding of the applications of managerial economics.
- Interpret regression analysis and discuss why it's employed in decision-making.
- Discuss optimization and utility including consumer behaviour.
- Assess the relationships between short-run and long-run costs.
- Analyze perfectly competitive markets including substitution.
- Explain uniform pricing and how it relates to price discrimination and total revenue.

THEORY

COMPUTER GRAPHICS AND MULTIMEDIA SYSTEM:

BCA-403

- Students will demonstrate an understanding of contemporary graphics hardware.
- Students will create interactive graphics applications in C++ using one or more graphics.
- Students will create interactive graphics applications in C++ using one or more graphics application programming interfaces.
- Students will write program functions to implement graphics primitives.
- Students will write programs that demonstrate geometrical transformations.

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THEORY

DATA BASE MANAGEMENT SYSTEM:

BCA-404

- Understand, appreciate and effectively explain the underlying concepts of database Technologies.
- Design and implement a database schema for a given problem-domain.
- Normalize a database and Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on a database.
- Concept of transaction and concurrency.

THEORY

SOFTWARE ENGINEERING:

BCA-405

- Understand the importance of the stages in the software life cycle.
- Understand the various process models.
- Be able to design software by applying the software engineering principles.

PRACTICAL

COMPUTER GRAPHICS AND MULTI MEDIA SYSTEM LAB:

BCA-406P

- To develop the programs for computer graphics using C language.
- Demonstrate simple 2D animations using animation software (Like Dreamweaver 8.0, Flash Player 8.0)
- Prepare simple scenes using image editing software. (like Photoshop)

PRACTICAL

DBMS LAB:

BCA-407P

- Demonstrate an understanding of the relational data model.
- Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.

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- Formulate, using relational algebra, solutions to a broad range of query problems.
- Formulate, using SQL, solutions to a broad range of query and data update problems.

PRACTICAL

SOFTWARE ENGINEERING LAB:

BCA-408P

- Create models for software applications.
- Use the different UML notations for designing software.

SEMESTER V

THEORY

DATA COMMUNICATION AND COMPUTER NETWORK:

BCA-501

- Explain how communication works in computer networks and to understand the basic terminology of computer networks.
- Explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
- Understand design issues in network security and to understand security threats, security services and mechanisms to counter.

THEORY

DESIGN AND ANALYSIS OF ALGORITHM:

BCA-502

- Able to walk through insert and delete for different data structures.
- Ability to calculate and measure efficiency of code.
- Appreciate some interesting algorithms like Huffman, Quick Sort, and Shortest Path etc.
- Able to walkthrough algorithm.
- Improve programming skills.

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THEORY

WEB DESIGN CONCEPT:

BCA-503

- Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, JavaScript, VBScript, ASP, PHP and protocols in the workings of the web and web applications. Analyze a web project and identify its elements and attributes in comparison to traditional projects.
- Understand, analyze and create web pages using HTML, DHTML and Cascading Styles Sheets.
- Understand, analyze and build dynamic web pages using JavaScript and VB Script (client side programming).
- Understand, analyze and build interactive web applications.
- Understand, analyze and build web applications using PHP.
- Understand, analyze and create XML documents and XML Schema.

THEORY

UNIX AND SHELL PROGRAMMING:

BCA-504

- Will be able to describe and use the LINUX operating system.
- Will be able to describe and use the fundamental LINUX system tools and utilities.
- We will be able to describe and write shell scripts in order to perform basic shell programming.
- Will be able to describe and understand the LINUX file system.

THEORY (ELECTIVE)

DATA MINING AND DATA WAREHOUSING:

BCA-505

- Have a deeper understanding of database systems and their underlying theory to be able to improve the decision-making process.
- Understand the technology of data warehousing.
- Understand data mining concepts and techniques.

PRACTICAL

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UNIX LAB:

BCA-506P

- Learn UNIX structure, commands, and utilities.
- Describe and understand the UNIX file system.
- Write shell scripts in order to perform shell programming.
- Acquire knowledge about text processing utilities, process management and system operation of UNIX.

PRACTICAL

WEB DESIGN LAB:

BCA-507P

- Successfully created HTML document with Tables, Frames using different tags layout.
- Successfully run a HTML program using JavaScript with variables, control structures and popup boxes.
- Understand object based programming and run programs with function objects.
- Understand JavaScript and Successfully run programs of JavaScript with HTML.

PRACTICAL

DATA COMMUNICATION AND COMPUTER NETWORK LAB:

BCA-508P

- Understand the concepts of communication, transmission and modulation.
- Understand the concepts of transmission media, multiplexing and channel allocation.
- Understand the fundamental of networking, network models etc
- Understand the network issues, types of services and collisions.

SEMESTER VI

THEORY

E-COMMERCE:

BCA-601



2.6.1 Teachers and students are aware of the stated programme and course outcomes of the programmes offered by the institution.

- Have knowledge of e-commerce, its components, structure of e-banking, rules and regulations on ecommerce.
- Acquire a good knowledge of e-commerce, both the technical and business aspects.
- Understand the principles and practices of e-commerce and its related technologies.
- Discuss the trends in e-Commerce and the use of the Internet.
- Explain the economic consequences of e-Commerce.

THEORY

CYBER LAW AND INTERNET SECURITY:

BCA-602

- Understand the consequences of ignoring and non-compliance with ethical imperatives.
- Learn about the best ethical practices and models.
- Develop a sound methodology in resolving ethical conflicts and crisis.
- Learn about the issues directly related to information technology environment and professionals.

THEORY

MOBILE COMPUTING:

BCA-603

- Have the understanding of different generations, terminologies, systems, operations and design of wireless and mobile communications.
- Acquire sufficient knowledge about IEEE 802.11 and Bluetooth standards.
- Be able appreciate the contribution of Mobile and Wireless Communication networks to overall technological growth.
- Understand the concepts and technology involved in 3G, 4G and 5G Networks.

THEORY

OPTIMIZATION TECHNIQUES:

BCA-6041

After the completion of the course, students are expected to have the ability to:



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- Understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.
- Develop and promote research interest in applying optimization techniques in problems of Engineering and Technology.
- Apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

THEORY

MICROPROCESSOR:

BCA-6042

After the completion of the course, students are expected to have the ability to:

- Identify the basic element and functions of 8085 microprocessor.
- Describe the general architecture & organization of 8085.
- Analyze and suggest various machine cycles and addressing modes.
- Apply the programming techniques in developing the assembly language program.
- Differentiate various types of interrupt in 8085 microprocessor.

THEORY

DATA COMPRESSION:

BCA-6043

- After the completion of the course, students are expected to have the ability to:
- Understand the concepts of commonly used lossless and lossy compression techniques.
- Analyze the applications of Huffman coding, loss less image compression, Text compression, Audio Compression.
- Analyze various Image compression and dictionary based techniques.
- Understand the statistical basis and performance metrics for lossless compression.
- Understand the concept of scalar quantization in data compression techniques.

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THEORY

CRYPTOGRAPHY:

BCA-6044

- After the completion of the course, students are expected to have the ability to:
- Learn the basic concepts of security threats, mechanisms and symmetric cryptography
- Understand the conventional encryption algorithms.
- Understand modern block cipher and public key encryption techniques analysis.
- Understand the concept of Hash functions and message authentication.

ADVANCED TECHNOLOGY (DOT NET) LAB

BCA-605P

Course Outcomes (Cos):

At the end of this course students will be able to:

- CO-1. Understand the concept of Programming Console applications using VB.NET.
- CO-2. Illustrate Exception Handling concepts.
- CO-3. Build web applications using web controls.