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LPCPS
LUCKNOW PUBLIC COLLEGE OF PROFESSIONAL STUDIES

LUCKNOW PUBLIC COLLEGE OF PROFESSIONAL STUDIES

BACHELOR OF COMPUTER APPLICATION (BCA)

(SESSION 2024-2025)

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

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	SOFT SKILLS AND PERSONALITY DEVELOPMENT 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 LAB
NBCA-208P	OPERATING SYSTEM LAB
NBCA-GP	GENERAL PROFICIENCY

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Semester-3	
NBCA-301	OBJECT ORIENTED PROGRAMMING USING JAVA
NBCA-302	SOFTWARE ENGINEERING
NBCA-303	COMPUTER ARCHITECTURE
NBCA-304	PYTHON PROGRAMMING
NBCA-305	ACCOUNTING AND FINANCIAL MANAGEMENT
NBCA-306P	JAVA LAB
NBCA-307P	PYTHON PROGRAMMING LAB
NBCA-308P	INDUSTRIAL TRAINING VIVA - VOCE
NBCA-GP	GENERAL PROFICIENCY
Semester-4	
NBCA-401	ADVANCE JAVA TECHNOLOGY
NBCA-402	DESIGN AND ANALYSIS OF ALGORITHM
NBCA-403	WEB DESIGN CONCEPTS
NBCA-404	COMPUTER GRAPHICS
NBCA-405	MANAGERIAL ECONOMICS
NBCA-406P	ADVANCE JAVA TECHNOLOGY LAB
NBCA-407P	WEB DESIGN LAB
NBCA-408P	COMPUTER GRAPHICS LAB
NBCA-GP	GENERAL PROFICIENCY
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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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.
- 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.

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- 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
- 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
SOFT SKILLS AND PERSONALITY DEVELOPMENT LAB:

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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.
- 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

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

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

PRACTICAL
DATA STRUCTURE LAB:
NBCA-206P

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

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

PRACTICAL
DBMS LAB
BCA-207P

- **Getting Familiar with SQL Commands**
- **Relational database implementation**

PRACTICAL
NBCA-208P
OPERATING SYSTEM LAB

- **Implementation of various CPU scheduling algorithms.**
- **Implementation of Banker's Algorithm**
- **Implementation of different Page Replacement policies**

SEMESTER III

THEORY
OBJECT ORIENTED PROGRAMMING USING JAVA
NBCA-301

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

- 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.
- 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

SOFTWARE ENGINEERING:

NBCA-302

- 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.

THEORY

COMPUTER ARCHITECTURE

NBCA-303

- 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.

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THEORY
PYTHON PROGRAMMING
NBCA-304

- **Understanding the basic concept of python**
- **Understanding variable, data types, loop, and properties of python.**
- **Understanding the concept of strings and its associated functions.**
- **Understand the object-oriented concept in python**
  Apply knowledge of python on file using pandas and numpy.

THEORY
ACCOUNTING AND FINANCIAL MANAGEMENT
BCA-305

- **Understand the fundamentals and basic concepts of Financial Accounting.**
- **Apply various Accounting Principles and Standards used in preparation of financial statements.**
- **Understand preparation and presentation of financial statements.**
- **Acquire knowledge about various techniques used in Financial Statement Analysis. Demonstrate the awareness about the concepts, scope and objectives of Financial Management.**

PRACTICAL
JAVA LAB
NBCA-306P

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

- 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.

PRACTICAL
PYTHON PROGRAMMING LAB
NBCA-307P

- **Understand the fundamentals of Python programming.**
- **Make programs in Python using list.**
- **Make programs Python using dictionary.**
- **Make programs Python using string.**
- **Make programs Python using tuple.**

PRACTICAL
INDUSTRIAL TRAINING VIVA - VOCE
NBCA-308P

SEMESTER IV

THEORY
ADVANCE JAVA TECHNOLOGY
NBCA-401

- Understand the concept of creating AWT, SWING,APPLET applications
- Understand Server Side Architecture of Web Applications.
- Connect to Database and do the CRUD Database operations using JDBC.

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- Develop Web Application by using Servlets and JSP.
- Manage Session in the web application.

THEORY
DESIGN AND ANALYSIS OF ALGORITHM
NBCA-402
THEORY

- Implementation of various sorting algorithm and their comparisons.
- Analyse the concept of Divide & Conquer and Greedy techniques.
- Implementation of Dynamic Programming concept in solving various problems.
- Understand the concepts such as NP-completeness and randomized algorithms.

WEB DESIGN CONCEPTS
NBCA-403

- Understand the knowledge of the internet and related internet concepts that are vital in understanding web application development.
- Analyse and apply the role of markup languages like HTML, DHTML, and XML in the workings of the web and web applications.
- Programming web pages with JavaScript.
- Design and implementation of build dynamic web pages using client side programming JavaScript and also develop the web application using servlet and JSP.

THEORY
COMPUTER GRAPHICS
NBCA-404

- Work with display systems.
- Execute various Scan Conversion algorithms in laboratory so as to draw Graphics primitives.

- Work with with 2D and 3D graphics.
- Develop creativity to create 2D objects.

THEORY
MANAGERIAL ECONOMICS
NBCA-405

- Understand the importance of Managerial Economics in Business Decision-Making.
- Apply the concepts and tools of economic analysis in Business Decision-Making..
- Apply the principles of managerial economics in achievement of business objectives.
- Apply the knowledge of the mechanics of supply and demand to explain working of markets.
- Understand and analyze the macro environment affecting the business decision making.

PRACTICAL

ADVANCE JAVA TECHNOLOGY LAB
NBCA-406P

- **Understand the concept of AWT.**
- **Write JDBC application.**
- **Make program for Applet.**
- **Make program for JSP.**

PRACTICAL
WEB DESIGN LAB
NBCA-407P

- Create basic level forms using HTML tags to understand a web page.
- Extend the knowledge of HTML by combining CSS tags for updating the existing web page.
- Understand the use of XML for sharing and storing of data using Schema.

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- Construct a dynamic web pages using Javascript also utilizing the knowledge of DTD.

PRACTICAL

COMPUTER GRAPHICS LAB:

NBCA-408P

- **DDA algorithms for line and circle and Bresenham's algorithms for circle and ellipse drawing.**
- **Mid-Point Circle algorithm Mid-Point Ellipse algorithm using C.**
- **Understand the implementation of clipping, rotation, reflection, and shearing.**
- **Perform basic operations on images using animation 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 ALGORITHAM:

BCA-502

- Implementation of various sorting algorithm and their comparisons.
- Analyse the concept of Divide & Conquer and Greedy techniques.
- Implementation of Dynamic Programming concept in solving various problems.
- Understand the concepts such as NP-completeness and randomized algorithms.

THEORY

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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 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 WAREHOUSHING:

BCA-5051

- Explore data warehouse and multi-dimensional data models.
- Gain insight into the challenges and limitations of different data mining technology.
- Understand the concepts such as classification, regression and clustering.
- Understand the concept of OLAP in data warehousing.

BCA-5052

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SOFTWARE TESTING METHODOLOGY

- Explain fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- Understand and implement the methods of functional and structural testing.
- Plan a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- Understand the advanced software testing topics, such as object-oriented software testing methods, system testing and testing of internet applications.

BCA-5053 OPEN SOURCE SOFTWARE

- Understand the concepts, strategies, and methodologies related to open source software development.
- Be familiar with open source software products and development tools currently available on the market.
- To utilize open source software for developing a variety of software applications, particularly Web applications.
- Understand the open source operating system and implement the open source database and programming languages.

BCA-5054

INFORMATION SYSTEM: ANALYSIS AND DESIGN & IMPLEMENTATION

- Describe principles, concepts and practice of System Analysis and Design process.
- Explain the processes of constructing the different types of information systems.
- Understand the various software development life cycle models and system documentation.
- Apply object oriented concepts to capture a business requirement.
- Learn the concept of system testing, evaluation and performance.

PRACTICAL

UNIX LAB:

BCA-506P

- Learn UNIX structure, commands, and utilities.
- Describe and understand the UNIX file system.

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- 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
VIVA-VOICE ON SUMMER TRAINING:
BCA-508P

SEMESTER VI

THEORY
E-COMMERCE:
BCA-601

- 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.

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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:

- 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:

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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.

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.

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- 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.

BCA-PRO

PROJECT

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