# PT. CHIRANJI LAL SHARMA GOVT. COLLEGE

# SECTOR -14, KARNAL

# PROGRAMME OUTCOME (PO) AND COURSE OUTCOME (CO) OF BCA, B.SC (C.SC) & B.SC (IT)

# BCA

Bachelor in Computer Application (BCA) is an undergraduate degree course in computer applications. With the rapid growth of IT industry in India, the demand of computer professional is increasing day by day. This increasing growth of IT industry has created a lot of opportunities for the computer graduates. Bachelor in Computer Application (BCA) is one of the popular courses among the students who want to make their career in the IT (Information Technology) field. The duration of the course is 3 years and divided into 6 semesters. It comprises of the subjects like database, networking, data structure, core programming languages like 'C' and 'java'. This course provides a lot of opportunities to the students who are interested in computer field and wants to work in the IT sector as programmer or software developer. To get complete knowledge about the course and career scope, you can go through this article.

## PROGRAMME OUTCOME

An ability to apply knowledge of computer science, mathematics in practice. In order to enhance programming skills of the young IT professionals, the program has introduced the concept of project development in each language/technology learnt during semester. The completion of the BCA Programme shall enable a student to:

- Focuses on Preparing Student for Roles pertaining to computer applications and IT industry.
- Start from the basics and in every semester learns each and everything about computers.
- Develop programming skills, networking skills; learn applications, packages, programming languages and modern techniques of IT.
- Learn programming language such as Java, c++, HTML, SQL, etc...
- Gives overview of the topics in IT like networking, computer graphics, web development, trouble shooting, and hardware and software skills.

## COURSE OUTCOME
*(Papers taught by the faculty of Computer Department)*

### BCA 1st Semester

**Learning outcomes of papers :-**

1) **Paper Code: BCA-111 : Computer & Programming Fundamentals:** Understanding the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming 2. Write, compile and debug programs in C language and use different data types for writing the programs.

2) **Paper Code: BCA-112 : Windows and PC Software:** - Introduces computing fundamentals from older, mature technologies through recent and emerging technologies. Utilizes key

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applications, such as word processing, spread sheet, database, and presentation software, to solve realistic problems.

3) **Paper Code: BCA-113 :Elements of Mathematical Foundation -I:** Students would have to
· Understand Set, subsets and operation on sets , power set of a set , partially ordered sets.

· Knowledge about continuity of a function of a single variable, Continuous function and classification of discontinuities.

· Know about higher order derivatives and Formation of differential equations, ordinary differential equations of first degree and the first order.

· Find solution of exact differential equations, Linear differential equations of higher order with constant coefficients application of differential equations to geometry.

4) **Paper Code: BCA-114 : Logical Organization of Computers**: - The student will be able to: Identify, understand and apply different number systems and codes. Understand the digital representation of data in a **computer** system. Understand the general concepts in digital **logic** design, including **logic** elements, and their use in combinational and sequential **logic** circuit design.

5) **Paper Code : BCA- 115 :Communication Skills :** Learn to write faxes, E-mails and text messages.
Understand articles , prepositions , subject-verb agreement, voices and reported speech. Learn to frame tag questions and the use of comparatives and superlatives.
Learn paragraph writing and how to compose official letters and applications.

6) **Paper Code: BCA-116 :Programming in 'C'**:- Understanding a functional hierarchical code organization. Ability to define and manage data structures based on problem subject domain. Ability to work with textual information, characters and strings.

## BCA 2nd Semester

1) **Paper Code: BCA-121: Advanced Programming in 'C' :-** Demonstrate an understanding of computer programming language concepts. To be able to develop C programs on Linux platform. Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage. Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures. Student must be able to define union and enumeration user defined data types. Develop confidence for self education and ability for life-long learning needed for Computer language.

2) **Paper Code: BCA-122 : Logical Organization of Computers-II:** Understand the digital representation of data in a **computer** system. Understand the general concepts in

digital **logic** design, including **logic** elements, and their use in combinational and sequential **logic** circuit design.

3) **Paper Code: BCA-123: Elements of Mathematical Foundation -II** : Students would have to

- Learn fundamental properties and mathematical tools such as closure, identity, inverse and generators.
- Study algebraic structure 'Groups' in detail which is useful in study of Rings.
- Enhance abstract thinking of students.
- Learn to compare two different algebraic structures and study transfer of properties in between these structures through homomorphism and isomorphism.
- Knowledge of Propositions and logical operators, truth tables and propositions generated by a set.
- Know about Matrices and their rank to use to find solution of system of linear equations.
- Find Characteristics equations of a square matrix, Cayley Hamilton theorem, eigen value and eigen vectors diagonalization of a square matrix.

4) **Paper Code: BCA-124 : Office Automation Tools: -** Demonstrate an understanding of computer hardware and **software**. Describe the features and functions of the categories of application **software**. Present conclusions effectively, orally and in writing. Understand the dynamics of an **office** environment.

5) **Paper Code: BCA- 125 : Structured System Analysis & Design**: - Explain what **systems** are and how they are developed. Identify and describe the phases of the **systems** development life cycle. Develop and deliver a Requirements Definition Proposal for a new **system** in a well-**structured** business proposal.

6) **Paper Code : BCA-126: Personality Development** : Understand the use of English in situations (Greetings, in the post office, catching a train, at a bank, making a telephone call, buying vegetables, at a hospital, on the bus etc). Develop personality and life skills (pronunciation, dressing, grooming, dining, voice modulation, etiquette, diction, assertive behavior, handling difficult situations, small talk, business manners etc.).

## BCA 3RD Semester

1) **Paper Code: BCA-231 : Object oriented Programming using 'C++':-** The model of **object oriented programming**: abstract data types, encapsulation, inheritance and polymorphism. Fundamental features of an **object oriented** language like Java: **object** classes and interfaces, exceptions and libraries of **object** collections. :- To learn the

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fundamental **programming** concepts and methodologies which are essential to building good C/C++ **programs**. ... To code, document, test, and implement a well-structured, robust computer **program** using the C/C++ **programming** language. To write reusable modules (collections of functions).

**2) Paper Code: BCA- 232 : Data Structures**: - Explores stacks, queues, lists, vectors, hash tables, graphs, trees and algorithms including sorting, searching, iterating over data structures and recursion. Effectively use software development tools including libraries, compilers, editors, linkers and debuggers to write and troubleshoot programs.

**3) Paper Code : BCA-233 : Computer Architecture**: - Demonstrate **computer architecture** concepts related to design of modern processors, memories and I/Os. Analyze the performance of commercially available **computers**.

**4) Paper Code: BCA-234: Software Engineering**: - an ability to develop and conduct appropriate experimentation analyzes and interprets data, and use **engineering** judgment to draw conclusions. An ability to acquire and apply new knowledge as needed, using appropriate **learning** strategies.

**5) Paper Code: BCA-235: Fundamentals Of Data Base System**: - The **outcome** of the **course** is to present an **introduction to database** management **systems**, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a **DBMS**.

**6) Paper Code: BCA- 236: Computer Oriented Numerical Methods** : Students would have to :

· Learn to apply the various numerical techniques for solving real life problems

· Solve the problems which cannot be solved by usual formulae and methods can be solved approximately by using numerical techniques.

· Find the solution of ordinary differential equation of first by Euler, Taylor and Runge- Kutta method

· Derive Simpson's 1/3 , 3/8 rules using trapezoidal rule

· Understand approximations, solution of equations and Interpolation.


# BCA 4$^{TH}$ Semester


**1) Paper Code: BCA-241: Advanced Data Structures**: - Explores stacks, queues, lists, vectors, hash tables, graphs, trees and algorithms including sorting, searching, iterating over data structures and recursion. Effectively use software development tools including libraries, compilers, editors, linkers and debuggers to write and troubleshoot programs.

**2) Paper Code: BCA-242: Advanced Programming Using C++ :** Gain a foundation for writing efficient, safe C++ code. **Learn** how to **use** STL libraries. Understand memory pitfalls **in** C++. Know how to expand the **C++** memory model. Utilize object-oriented for analysis and design. Apply multiple inheritances to an application. Understand how streams work.

**3) Paper Code: BCA-243: E-COMMERCE:** - Presents concepts and skills for the strategic use of e-commerce and related information technology from three perspectives: business to consumers, business-to-business, and intra-organizational. Examination of e-commerce in altering the structure of entire industries, and how it affects business processes including electronic transactions, supply chains, decision making and organizational performance.

**4) Paper Code: BCA-244: Relational Data Base Management System:** - Describe the fundamental elements of relational database management systems .Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. Design ER-models to represent simple database application scenarios .Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data. Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

**5) Paper Code : BCA-245: Computer Oriented Statistical Methods :** Students will able to

- Define probability density function, probability distribution
- Derive mathematical expectation, binomial, poison , normal distribution
- Solve the problems of large samples and small samples
- Discuss the moment generating functions, chi-square distribution
- Compute the analysis of variance, one way and two way classifications

**6) Paper Code: BCA-246: Management Information System:** - Understand the leadership role of **Management Information Systems** in achieving business competitive advantage through informed decision making. Effectively communicate strategic alternatives to facilitate decision making.

# BCA 5$^{TH}$ Semester

1) **Paper Code: BCA-351: Web Designing fundamentals:** - Apply critical thinking and problem solving skills required to successfully **design** and implement a **web** site. 2. Demonstrate the ability to analyze, identify and define the technology required to build and implement a **web** site.

**2) Paper Code: BCA-352: Operating Systems-1:** components of a computer **operating** system, and the interactions among the various components. The **course** will cover an introduction

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on the policies for scheduling, deadlocks, memory management, synchronization, **system** calls, and file **systems**.

**3) Paper Code: BCA-353: Artificial Intelligence** :- Develop a basic understanding of the building blocks of **AI** as presented in terms of **intelligent** agents: Search, Knowledge representation, inference, logic, and **learning**.

**4) Paper Code: BCA-354: Computer Networks**: - learning about **computer network** organization and implementation, obtaining a theoretical understanding of data communication and **computer networks**, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.

**5) Paper Code: BCA-355: Programming using Visual Basic**: - Students code **visual** programs by using **Visual Basic** work environment. Distinguish and compose events and methods. Recognize and arrange control structures. Design a complete program using **visual** programming concepts.

**6) Paper Code: BCA- 356: Multimedia Tools: -** identify the essential features of graphics/image data types, file formats, and color models in images and video. Explain the **technical** details of **multimedia** data representations. Perform a comparative analysis of the major methods and algorithms for **multimedia** data compression.

# BCA 6<sup>TH</sup> SEMESTER

**1) Paper Code: BCA-361 Web designing using advanced tools**: - This **course** will introduce you to the realm of **web design**. Understand how HTML works, and then we will proceed to more **advanced** and complicated structures. You'll learn **tools** to create international standard websites by your own. Pro level skills in SEO **with** keyword research and content strategy for your website.

**2) Paper Code: BCA-362: Operating Systems-II:** This Course Will Introduce:- Threads and thread usage • Multithreading operating system • Client – server model • Implementation of Client-server model • Remote procedure call • Implementation of remote procedure call • Synchronization in distributed systems • Clock synchronization • Mutual exclusion • Election algorithms • Transaction and concurrent control • Deadlock in distributed systems • Processor Allocation • Real – time distributed systems • Distributed file systems.

**3) Paper Code: BCA-363: Computer Graphics**: - Explain the core concepts of **computer graphics,** including viewing, projection, perspective, modeling and transformation in two and three dimensions. Apply the concepts of color models, lighting and shading models, textures, ray tracing, hidden surface elimination, anti-aliasing, and rendering.

**4) Paper Code: BCA-364: Internet Technologies:** - On completion of this **course**, a student will be familiar with client server architecture and able to develop a **web** application using

java **technologies**. Students will gain the skills and project-based experience needed for entry into **web** application and development careers.

**5)** <u>**Paper Code: BCA-365: Advanced programming with visual basic**</u>: - Modifying and/or creating programs that include multiple forms (splash, about, and processing). Modifying and/or creating programs that include a basic menu environment.

**6)** <u>**Paper Code: BCA-366: Programming in core java: -**</u> Use an integrated development environment to write, compile, run, and test simple object-oriented **Java programs**. Read and make elementary modifications to **Java programs** that solve real-world problems.

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## BSC ( COMPUTER SCIENCE)

## PROGRAMME OUTCOME OF BSC (COMPUTER SCIENCE):-

The **Computer Science** Department's Bachelor of **Science program** must enable students to attain, by the time of graduation: An ability to apply knowledge of **computing** and mathematics appropriate to the discipline. An ability to identify, formulates, and develops solutions to computational challenges.

## LEARNING OUTCOMES OF PAPERS:-

## BSC (C.SC) 1ST SEMESTER:

1) **Paper 1: Computer And Programming Fundamentals:** Analysing problems, and designing and implementing algorithmic solutions. Solving problems properly, achieving an implementation that is correct, effective and efficient. Using **computers** at user level, including operative systems and **programming** environments.

2) **Paper 2 : PC Software**: - Introduces computing fundamentals from older, mature technologies through recent and emerging technologies. Utilizes key applications, such as word processing, spread sheet, database, and presentation software, to solve realistic problems.
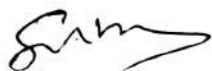
## BSC (C.SC) 2nd SEMESTER

1) **Paper 1: Programming in 'C'**:- Understanding a functional hierarchical code organization. Ability to define and manage data structures based on problem subject domain. Ability to work with textual information, characters and strings.

2) **Paper 2: Logical Organization of Computers**: - The student will be able to: • Identify, understand and apply different number systems and codes. Understand the digital representation of data in a **computer** system. Understand the general concepts in digital **logic** design, including **logic** elements, and their use in combinational and sequential **logic** circuit design.

## BSC (C.SC) 3rd SEMESTER:

1) **Paper 1: Data Structures**: - Explores stacks, queues, lists, vectors, hash tables, graphs, trees and algorithms including sorting, searching, iterating over data structures and recursion. Effectively use software development tools including libraries, compilers, editors, linkers and debuggers to write and troubleshoot programs.

2) **Paper 2: Software Engineering**: - an ability to develop and conduct appropriate experimentation analyzes and interprets data, and use **engineering** judgment to draw

conclusions. An ability to acquire and apply new knowledge as needed, using appropriate **learning** strategies.

## BSC (C.SC) 4<sup>th</sup> SEMESTER

**1) Paper 1: Object oriented Programming using 'C++':-** The model of **object oriented programming**: abstract data types, encapsulation, inheritance and polymorphism. Fundamental features of an **object oriented** language like Java: **object** classes and interfaces, exceptions and libraries of **object** collections. :- To learn the fundamental **programming** concepts and methodologies which are essential to building good C/C++ **programs**.To code, document, test, and implement a well-structured, robust computer **program** using the C/C++ **programming** language. To write reusable modules (collections of functions).

**2) Paper 2: Operating Systems**: components of a computer **operating** sys- tem, and the interactions among the various components. The **course** will cover an introduction on the policies for scheduling, deadlocks, memory management, synchronization, **system** calls, and file **systems**.

## BSC (C.SC) 5<sup>th</sup> SEMESTER:

**1) Paper 1: FUNDAMENTALS OF DATABASE SYSTEMS :-** The **objective** of the **course** is to present an **introduction to database** management **systems**, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a **DBMS**.

**2) Paper 2: WEB DESIGNING**: - Apply critical thinking and problem solving skills required to successfully **design** and implement a **web** site. 2. Demonstrate the ability to analyze, identify and define the technology required to build and implement a **web** site.

## BSC (C.SC) 6<sup>th</sup> SEMESTER:

**1) Paper1: Relational Data Base Management System**: - Describe the fundamental elements of relational database management systems .Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. Design ER-models to represent simple database application scenarios .Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data. Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

**2) Paper 2: COMPUTER NETWORKS**: - **learning** about **computer network** organization and implementation, obtaining a theoretical understanding of data communication **and computer networks**, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.

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# PROGRAMME OUTCOME OF B.SC (IT):-

Develop knowledge of scientific theories and methods, gain experience in working independently with scientific questions and their ability to express clearly on academic issues keeping in view legal, ethical, social security and issues. Function in multidisciplinary teams by working cooperatively, creatively and responsibly as a member of a team.

1. **COMPUTER SYSTEM ARCHITECTURE** :- Demonstrate **computer architecture** concepts related to design of modern processors, memories and I/Os. Analyze the performance of commercially available **computers**.

2. **PROGRAMMING IN 'C++'**:- To learn the fundamental **programming** concepts and methodologies which are essential to building good C/C++ **programs**. To code, document, test, and implement a well-structured, robust computer **program** using the C/C++ **programming** language. To write reusable modules (collections of functions).

3. **WEB-SITE DESIGN IMPLEMENTING BASIC DESIGN TOOLS**: - This course will introduce you to the realm of web design. The first and necessary step for that goal is to understand how HTML works, and then we will proceed to more advanced and complicated structures and concepts of web design, such as CSS and layout control. A series of tasks (website evaluation, website development, reflective report, collaborative website development, website self-assessment), as well as several group activities (discussions, online resource sharing, collaborative work) will help you gain practical experience on web development and a thorough understanding of web design issues.

4. **INTERNET CONCEPTS AND APPLICATIONS**: - On completion of this **course**, a student will be familiar with client server architecture and able to develop a **web** application using java **technologies**. Students will gain the skills and project-based experience needed for entry into **web** application and development careers.

5. **MICROPROCESSOR ARCHITECTURE AND PROGRAMMING**: - Recall and apply a basic concept of digital fundamentals to **Microprocessor** based personal **computer** system. CO2: identify a detailed s/w & h/w structure of the **Microprocessor**. CO3: illustrate how the different peripherals (8255, 8253 etc.) are interfaced with **Microprocessor**.

6. **EMBEDDED SYSTEMS & 8051 MICROCONTROLLER**: - Provide an overview of difference between **microprocessor** and micro controller. Provide background knowledge and core expertise in **microcontroller**. Study the architecture and addressing modes of **8051**. Help understand the importance of different peripheral **devices** & their interfacing to **8051**.

7. **COMPUTER PROGRAAMMING WITH 'C'**:- Understanding a functional hierarchical code organization. Ability to define and manage data structures based on problem subject domain. Ability to work with textual information, characters and strings.

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9. <u>**Software Engineering**</u>: - an ability to develop and conduct appropriate experimentation analyzes and interprets data, and use **engineering** judgment to draw conclusions. An ability to acquire and apply new knowledge as needed, using appropriate **learning** strategies.

10. <u>**Object oriented Programming using 'C++'**</u> :- The model of **object oriented programming**: abstract data types, encapsulation, inheritance and polymorphism. Fundamental features of an **object oriented** language like Java: **object** classes and interfaces, exceptions and libraries of **object** collections :- To learn the fundamental **programming** concepts and methodologies which are essential to building good **C/C++ programs**. ... To code, document, test, and implement a well-structured, robust computer **program** using the **C/C++ programming** language. To write reusable modules (collections of functions).

11. <u>**Operating Systems**</u>: - components of a computer **operating** sys- tem, and the interactions among the various components. The **course** will cover an introduction on the policies for scheduling, deadlocks, memory management, synchronization, **system** calls, and file **systems**.

12. <u>**Relational Data Base Management System**</u>: - Describe the fundamental elements of relational database management systems. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. Design ER-models to represent simple database application scenarios. Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data. Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

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# PROGRAMME OUTCOME OF BSC (COMPUTER SCIENCE):-

The Computer Science Department's Bachelor of **Science program** must enable students to attain, by the time of graduation: An ability to apply knowledge of **computing** and mathematics appropriate to the discipline. An ability to identify, formulates, and develops solutions to computational challenges.

1. **FUNDAMENTALS OF DATABASE SYSTEMS** :- The **outcome** of the **course** is to present an **introduction to database** management **systems**, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a **DBMS**.

2. **WEB DESIGNING**: - Apply critical thinking and problem solving skills required to successfully **design** and implement a **web** site. Demonstrate the ability to analyze, identify and define the technology required to build and implement a **web** site.

3. **COMPUTER NETWORKS**: - **learning** about **computer network** organization and implementation, obtaining a theoretical understanding of data communication and **computer networks**, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.

4. **COMPUTER AND PROGRAMMING FUNDAMENTALS** :- On completion of the **course** students should be able to: Use technology ethically, safely, securely, and legally. Identify and analyze **computer** hardware, software, and network components. Use systems development, word-processing, spreadsheet, and presentation software to solve basic information systems problems.

5. **PC SOFTWARE** :- Demonstrate a basic understanding of computer hardware and **software**. Demonstrate problem-solving skills. Apply logical skills to programming in a variety of languages. Utilize web technologies. Present conclusions effectively, orally, and in writing. Demonstrate basic understanding of network principles.

6. **PROGRAMMING IN C**:- Understanding a functional hierarchical code organization. Ability to define and manage data structures based on problem subject domain. Ability to work with textual information, characters and strings.

7. **LOGICAL ORGANISATION OF COMPUTERS** :- The student will be able to: Identify, understand and apply different number systems and codes. Understand the digital representation of data in a **computer** system. Understand the general concepts in digital **logic** design, including **logic** elements, and their use in combinational and sequential **logic** circuit design.

8. **DATA STRUCTURES** :- Explores stacks, queues, lists, vectors, hash tables, graphs, trees and algorithms including sorting, searching, iterating over data structures and recursion. Effectively use software development tools including libraries, compilers, editors, linkers and debuggers to write and troubleshoot programs.

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arrange control structures. Design a complete program using **visual** programming concepts.

19. **Multimedia Tools: -** identify the essential features of graphics/image data types, file formats, and color models in images and video. Explain the **technical** details of **multimedia** data representations. Perform a comparative analysis of the major methods and algorithms for **multimedia** data compression.

20. **Computer Graphics**: - Explain the core concepts of **computer graphics**, including viewing, projection, perspective, modeling and transformation in two and three dimensions. Apply the concepts of color models, lighting and shading models, textures, ray tracing, hidden surface elimination, anti-aliasing, and rendering.

21. **Internet Technologies: -** On completion of this **course**, a student will be familiar with client server architecture and able to develop a **web** application using java **technologies**. Students will gain the skills and project-based experience needed for entry into **web** application and development careers.

22. **Programming in core java: -** Use an integrated development environment to write, compile, run, and test simple object-oriented **Java programs**. Read and make elementary modifications to **Java programs** that solve real-world problems.

23. **Management Information System**: - Understand the leadership role of **Management Information Systems** in achieving business competitive advantage through informed decision making. ... Effectively communicate strategic alternatives to facilitate decision making.

24. **Web designing using advanced tools**: - This **course** will introduce you to the realm of **web design**. Understand how HTML works, and then we will proceed to more **advanced** and complicated structures. You'll learn **tools** to create international standard websites by your own Pro level skills in SEO **with** keyword research and content strategy for your website.

25. **Advanced programming with visual basic**: - Modifying and/or creating programs that include multiple forms (splash, about, and processing). Modifying and/or creating programs that include a basic menu environment.

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# BCA PROGRAMME OUTCOME: - An ability to apply knowledge

of computer science, mathematics in practice. In order to enhance programming skills of the young IT professionals, the program has introduced the concept of project development in each language/technology learnt during semester.

1. **Computer & Programming Fundamentals:** Understanding the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming. Write, compile and debug programs in C language and use different data types for writing the programs.

2. **Windows and PC Software**: - Introduces computing fundamentals from older, mature technologies through recent and emerging technologies. Utilizes key applications, such as word processing, spread sheet, database, and presentation software, to solve realistic problems.

3. **Logical Organization of Computers**: - The student will be able to: Identify, understand and apply different number systems and codes. Understand the digital representation of data in a **computer** system. Understand the general concepts in digital **logic** design, including **logic** elements, and their use in combinational and sequential **logic** circuit design.

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5. **Office automation tools:** - Demonstrate an understanding of computer hardware and **software**. Describe the features and functions of the categories of application **software**. Present conclusions effectively, orally and in writing. Understand the dynamics of an **office** environment.

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Effectively use software development tools including libraries, compilers, editors, linkers and debuggers to write and troubleshoot programs.

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12. **E-COMMERCE**: - Presents concepts and skills for the strategic use of e-commerce and related information technology from three perspectives: business to consumers, business-to-business, and intra-organizational. Examination of e-commerce in altering the structure of entire industries, and how it affects business processes including electronic transactions, supply chains, decision making and organizational performance.

13. **Relational Data Base Management System**: - Describe the fundamental elements of relational database management systems. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. Design ER-models to represent simple database application scenarios. Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data. Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

14. **Web Designing fundamentals**: - Apply critical thinking and problem solving skills required to successfully **design** and implement **a web** site. Demonstrate the ability to analyze, identify and define the technology required to build and implement a **web** site.

15. **Operating Systems**: - components of computer **operating** systems - terms and the interactions among the various components. The **course** will cover an introduction on the policies for scheduling, deadlocks, memory management, synchronization. **system** calls, and file **systems**.

16. **Artificial Intelligence**: - Develop a basic understanding of the building blocks of **AI** as presented in terms of **intelligent** agents: Search, Knowledge representation, inference, logic, and **learning**.

17. **Computer Networks**: - learning about **computer** **network** organization and implementation, obtaining a theoretical understanding of data communication and **computer networks**, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.

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