

**M.S. RAMAIAH COLLEGE OF ARTS, SCIENCE AND COMMERCE**

**Course Outcomes for BCA Program**

<b>Program</b>	<b>CourseCode</b>	<b>CourseName</b>	<b>COCode</b>	<b>CO</b>
BCA – Bachelor of Computer Applications	ENG11S	English	CO1	Develop English language skills in listening, speaking, reading and writing by having learners engage in a range of communicative tasks and activities suiting Indian context
BCA – Bachelor of Computer Applications	ENG11S	English	CO2	Encourage the use of strategies, such as contextualization of new vocabulary, use of previewing, skimming and scanning techniques, and knowledge of text organization and discourse markers, to aid the comprehension of written and spoken language.
BCA – Bachelor of Computer Applications	ENG11S	English	CO3	Demonstrate an awareness of the significance of literature and of literary form by being conversant about the functions of texts and their relations with historical, social and political contexts.
BCA – Bachelor of Computer Applications	ENG11S	English	CO4	Create awareness about the new learning styles to comprehend the theme and genre and the relevance of it in a better and deeper way and also to increase the competence in the use of ICT so that learners may more effectively achieve academic goals.
BCA – Bachelor of Computer Applications	ENG11S	English	CO5	Learn and practice academic paragraph and essay elements including a central idea supported by relevant details and transitions, with unity and organization.
BCA – Bachelor of Computer Applications	SB7104	Problem Solving Techniques using C	CO1	Understand in details with application, if applicable, : Introduction to Programming Concepts and overview of C
BCA – Bachelor of Computer Applications	SB7104	Problem Solving Techniques using C	CO3	Learn in detail about Managing input and output operations, Decision making, branching and looping and function concept
BCA – Bachelor of Computer Applications	SB7104	Problem Solving Techniques using C	CO6	Specify the classification and characteristics of Arrays, Strings and its operations
BCA – Bachelor of Computer Applications	SB7104	Problem Solving Techniques using C	CO9	Deliberate the details of Structures and unions, Pointer concept

BCA – Bachelor of Computer Applications	SB7104	Problem Solving Techniques using C	CO11	Identify in details with examples about Files concept in C
BCA – Bachelor of Computer Applications	SB7104	Computer Organization	CO1	Deliberate the classification and characteristics of number system,Basic conversion,complements,weighted and non-weighted codes.
BCA – Bachelor of Computer Applications	SB7104	Computer Organization	CO2	Understand the classification and characteristics of logic gates,flip-flops,k-map,combinational circuit
BCA – Bachelor of Computer Applications	SB7104	Computer Organization	CO3	Understand the characteristics of Computer Organization,Instruction format,types of instruction format,instruction cycle,interrupts
BCA – Bachelor of Computer Applications	SB7104	Computer Organization	CO4	Deliberate ALU,one address,two address and three address instruction format,data transfer and data manipulation instruction
BCA – Bachelor of Computer Applications	SB7104	Computer Organization	CO5	Understand in details with examples Memory management,input devices,output devices,storage devices
BCA – Bachelor of Computer Applications	SB7105	Discrete Mathematics	CO1	Understand the characteristics of Matrices
BCA – Bachelor of Computer Applications	SB7105	Discrete Mathematics	CO4	Understand the details of groups and vectors
BCA – Bachelor of Computer Applications	SB7105	Discrete Mathematics	CO5	Identify the classification and characteristics of analytical geometry
BCA – Bachelor of Computer Applications	SB7105	Discrete Mathematics	CO2	Understand in details with examples sets, functions and logic
BCA – Bachelor of Computer Applications	SB7105	Discrete Mathematics	CO3	Identify in details with application, if applicable, logarithms, permutation and combination
BCA – Bachelor of Computer Applications	SB7103	DIGITAL ELECTRONICS	CO1	Learn the details of Introduction to network theorems and AC fundamentals: Ohm’s law: Statement, explanation. Kirchhoff’s law: Statement & explanation of KCL and KVL. Mesh/loop analysis
BCA – Bachelor of Computer Applications	SB7103	DIGITAL ELECTRONICS	CO2	Understand in depth Semiconductor Devices: Introduction, atomic structure, energy level, energy band diagram in solids, classification of conductors, insulators and semiconductors. Semiconductor, properties, crystal structure of semiconductor, types – intrinsic and extrinsic semiconductor
BCA – Bachelor of Computer Applications	SB7103	DIGITAL ELECTRONICS	CO3	Deliberate in details with application, if applicable, Number Systems: Introduction to number systems – positional and non-positional, Base /Radix. Decimal number system-Definition, digits, radix/base, Binary number system – Bit Byte,

					Conversions: Binary to Decimal and Decimal to Binary
BCA – Bachelor of Computer Applications	SB7103	DIGITAL ELECTRONICS	CO4		Learn in depth Logic Gates: AND Gate: Definition, symbol truth table, timing diagram
BCA – Bachelor of Computer Applications	SB7103	DIGITAL ELECTRONICS	CO5		Specify in details with application, if applicable, Sequential Circuits: Importance of clock in digital circuit and introduction to flip flop. Flip –flop-difference between latch and flip-flop.
BCA – Bachelor of Computer Applications	SB7106	Data structures	CO3		Specify the classification and characteristics of Linked list: Definition, Representation of Singly linked list in memory, Traversing a Singly linked list, Searching a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list
BCA – Bachelor of Computer Applications	SB7106	Data structures	CO4		Identify in details with application, if applicable, Stacks – Definition, Array representation of stacks, Linked representation of stacks, Stack as ADT. Queues – Definition, Array representation of queue, Linked list representation of queues Types of queue.
BCA – Bachelor of Computer Applications	SB7106	Data structures	CO5		Write down in details with application, if applicable, Graphs: Graph theory terminology, Sequential representation of Graphs: Adjacency matrix, traversing a Graph. Tree – Definitions, Binary trees, Representing binary trees in memory, Traversing Binary Trees.
BCA – Bachelor of Computer Applications	SB7106	Data structures	CO1		Learn in details with examples Data Structures, data structures operations, Abstract data types, algorithms complexity, time-space tradeoff. Preliminaries: Mathematical notations and functions, Algorithmic notations
BCA – Bachelor of Computer Applications	SB7106	Data structures	CO2		Deliberate the classification and characteristics of Arrays: Definition, Linear arrays, arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear arrays, Inserting and deleting, Sorting: Bubble sort, Insertion sort, Selection sort, Searching
BCA – Bachelor of Computer Applications	SB7107	Database Management System	CO4		Understand in details with application, if applicable, Relational Database Language:
BCA – Bachelor of Computer Applications	SB7107	Database Management System	CO5		Identify the details of Transaction Processing Concepts:
BCA – Bachelor of Computer Applications	SB7107	Database Management System	CO3		Specify in details with examples Functional Dependencies and Normalization for Relational Database:

BCA – Bachelor of Computer Applications	SB7107	Database Management System	CO1	Learn in details with application, if applicable, Introduction: Database,DBMS
BCA – Bachelor of Computer Applications	SB7107	Database Management System	CO2	Write down the classification and characteristics of Data Modeling Using the Entity-Relationship Model:
BCA – Bachelor of Computer Applications	SB7108	Numerical and Statistical Methods	CO1	Understand in details with examples Floating Points and roots of equations
BCA – Bachelor of Computer Applications	SB7108	Numerical and Statistical Methods	CO2	Write down in details with examples statistics
BCA – Bachelor of Computer Applications	SB7108	Numerical and Statistical Methods	CO3	Identify in depth probability
BCA – Bachelor of Computer Applications	SB7108	Numerical and Statistical Methods	CO4	Understand in depth Interpolation and numerical differentiation
BCA – Bachelor of Computer Applications	SB7108	Numerical and Statistical Methods	CO5	Write down the classification and characteristics of System of linear equations
BCA – Bachelor of Computer Applications	ENGC3S	English	CO1	Develop English language skills in listening, speaking, reading and writing by having learners engage in a range of communicative tasks and activities suiting Indian context.
BCA – Bachelor of Computer Applications	ENGC3S	English	CO-2	Encourage the use of strategies, such as contextualization of new vocabulary, use of previewing, skimming and scanning techniques, and knowledge of text organization and discourse markers, to aid the comprehension of written and spoken language.
BCA – Bachelor of Computer Applications	ENGC3S	English	CO-3	Demonstrate an awareness of the significance of literature and of literary form by being conversant about the functions of texts and their relations with historical, social and political contexts.
BCA – Bachelor of Computer Applications	ENGC3S	English	CO-4	Create awareness about the new learning styles to comprehend the theme and genre and the relevance of it in a better and deeper way and also to increase the competence in the use of ICT so that learners may more effectively achieve academic goals.
BCA – Bachelor of Computer Applications	ENGC3S	English	CO-5	Learn and practice academic paragraph and essay elements including a central idea supported by relevant details and transitions, with unity and organization.
BCA – Bachelor of Computer Applications	SB7109	Object Oriented	CO1	understand the c++ features, functions

			Programming using C++		
BCA – Bachelor of Computer Applications	SB7109	Object Oriented Programming using C++	CO3	Specify characteristics of Operator overloading	
BCA – Bachelor of Computer Applications	SB7109	Object Oriented Programming using C++	CO5	Learn in details with examples about Template concept and Exception handling methods	
BCA – Bachelor of Computer Applications	SB7109	Object Oriented Programming using C++	CO4	Identify the purpose of Virtual functions, friend function	
BCA – Bachelor of Computer Applications	SB7109	Object Oriented Programming using C++	CO2	learn in depth about Objects and Classes, Constructors & destructors	
BCA – Bachelor of Computer Applications	SB7110	Financial Accounting and Management	CO1	Write down the classification and characteristics of History and Development of Accounting	
BCA – Bachelor of Computer Applications	SB7110	Financial Accounting and Management	CO2	Learn in details with application, if applicable, Financial Accounting Process	
BCA – Bachelor of Computer Applications	SB7110	Financial Accounting and Management	CO3	Specify the characteristics of Accounting for bills of Exchange	
BCA – Bachelor of Computer Applications	SB7110	Financial Accounting and Management	CO4	Understand the details of Preparation of Final Accounts	
BCA – Bachelor of Computer Applications	SB7110	Financial Accounting and Management	CO5	Learn in details with examples Accounting package like tally	
BCA – Bachelor of Computer Applications	SB7111	Operating System	CO5	Deliberate in details with examples Protection and Security	
BCA – Bachelor of Computer Applications	SB7111	Operating System	CO4	Learn the details of File management	
BCA – Bachelor of Computer Applications	SB7111	Operating System	CO3	Learn the details of Memory Management	
BCA – Bachelor of Computer Applications	SB7111	Operating System	CO2	Identify in details with application, if applicable, Process Synchronization and deadlocks	
BCA – Bachelor of Computer Applications	SB7111	Operating System	CO1	Deliberate in details with application, if applicable, Batch Systems, Concepts of Multi programming and Time Sharing	
BCA – Bachelor of Computer Applications	SB7112	Visual Programing	CO1	Understanding Visual programming IDE,events and methods	

BCA – Bachelor of Computer Applications	SB7112	Visual Programing	CO2	Write down the details of Arrays,menus and toolbars
BCA – Bachelor of Computer Applications	SB7112	Visual Programing	CO3	Specify in details with examples OOPs methods and properties,file handling,Active X
BCA – Bachelor of Computer Applications	SB7112	Visual Programing	CO4	Identify in details with application, Visual C++ Programming ,VC++ components
BCA – Bachelor of Computer Applications	SB7112	Visual Programing	CO5	Understand the classification and characteristics of Interfacing other applications,OLE,DLL,ODBC
BCA – Bachelor of Computer Applications	SB7113	Unix Shell programming	CO2	Deliberate the details of Introduction to Unix system architecture,Unix File System and Process Management
BCA – Bachelor of Computer Applications	SB7113	Unix Shell programming	CO2	Write down in depth Secondary Storage Management
BCA – Bachelor of Computer Applications	SB7113	Unix Shell programming	CO3	Identify in details with examples Shell Programming
BCA – Bachelor of Computer Applications	SB7113	Unix Shell programming	CO4	Deliberate in details with examples Conditional Control Structures
BCA – Bachelor of Computer Applications	SB7113	Unix Shell programming	CO5	Specify the details of Unix System Communication
BCA – Bachelor of Computer Applications	SB7114	Operation Research	CO4	Understand the details of Network Analysis
BCA – Bachelor of Computer Applications	SB7114	Operation Research	CO5	Write down in details with examples Theory of Games
BCA – Bachelor of Computer Applications	SB7114	Operation Research	CO1	Identify the details of Linear Programming Problems
BCA – Bachelor of Computer Applications	SB7114	Operation Research	CO2	Specify the classification and characteristics of Transportation Problem
BCA – Bachelor of Computer Applications	SB7114	Operation Research	CO3	Write down in depth Assignment Problem
BCA – Bachelor of Computer Applications	SB7115	Data Communication and Networks	CO3	Learn the characteristics of Peer –to-Peer Protocols, ARQ protocol and types, DLC, HDLC, PPP, Statistical multiplexing
BCA – Bachelor of Computer Applications	SB7115	Data Communication and Networks	CO4	Learn the characteristics of Local Area Networks and Medium access Control Protocols, ALOHA, CSMA, CSMA/CD, Channelization – FDMA, TDMA, CDMA
BCA – Bachelor of Computer Applications	SB7115	Data Communication and Networks	CO5	Identify in details with examples LAN Standard – Ethernet and IEF, 802.3, LAN Bridges , Routing algorithms, congestion control algorithms
BCA – Bachelor of Computer Applications	SB7115	Data Communication and Networks	CO2	Specify in details with examples Transmission Systems:properties, transmission media, Error detactions and error correction techniques, TDM,FDM, SONET, Cellular Networks
BCA – Bachelor of Computer Applications	SB7115	Data Communication and Networks	CO1	Learn in depth Communication Network and services, Approaches to Network Design, Network Functions and Network Topology, Message ,packet and circuit Switching , Internet, Packet Switching ;

					Key factors in Communication Network Evolution ; Layered Architecture and Applications – Examples of Layering , OSI Reference Model, TCP/IP Model Telnet FTP and IP Utilities. Digital Transmission: Digital Representation of Information: Properties of digital transmission: Characterization of Communication Channels Frequency Domain and Time Domain : Fundamental limits in Digital Communication – The Nyquist Signalling rate, The Shannon channel capacity : Line coding , Modems & digital Modulations
BCA – Bachelor of Computer Applications	SB7116	Software Engineering	CO1	Identify in details with application, if applicable, Introduction to software products & process	
BCA – Bachelor of Computer Applications	SB7116	Software Engineering	CO2	Learn the characteristics of Software prototyping:prototyping in software process	
BCA – Bachelor of Computer Applications	SB7116	Software Engineering	CO3	Identify the classification and characteristics of Object oriented and function oriented design	
BCA – Bachelor of Computer Applications	SB7116	Software Engineering	CO4	Deliberate the characteristics of Software reliability and reusability	
BCA – Bachelor of Computer Applications	SB7116	Software Engineering	CO5	Learn the classification and characteristics of Software verification and validation:testing process	
BCA – Bachelor of Computer Applications	SB7117	Computer Architecture	CO5	Understand the asynchronous data transfer techniques, data transfer modes	
BCA – Bachelor of Computer Applications	SB7117	Computer Architecture	CO4	Understand in details with bus organization, instruction formats, addressing modes	
BCA – Bachelor of Computer Applications	SB7117	Computer Architecture	CO1	Understand the classification and characteristics of Digital logic circuits,flip flops,multiplexers, k map	
BCA – Bachelor of Computer Applications	SB7117	Computer Architecture	CO2	Learn in details with number system, binary codes,data transfer operations	
BCA – Bachelor of Computer Applications	SB7117	Computer Architecture	CO3	Learn the complete computer description	
BCA – Bachelor of Computer Applications	SB7118	Java Programming	CO1	Write down in details with examples Introduction to JAVA	
BCA – Bachelor of Computer Applications	SB7118	Java Programming	CO2	Write down in depth Classes, Arrays, Strings and Vectors	
BCA – Bachelor of Computer Applications	SB7118	Java Programming	CO3	Write down the details of Interfaces, Packages, and Multi threaded Programming	
BCA – Bachelor of Computer Applications	SB7118	Java Programming	CO4	Understand the classification and characteristics of Managing Exceptions, Applet Programming	
BCA – Bachelor of Computer Applications	SB7118	Java Programming	CO5	Identify the classification and characteristics of Graphics Programming, Input/Output: Graphics programming	
BCA – Bachelor of Computer Applications	SB7119	Microprocessor and Assembly Language	CO2	Understand the details of programs of 8085	

BCA – Bachelor of Computer Applications	SB7119	Microprocessor and Assembly Language	CO1	Write down the characteristics of Architecture and operations of 8085
BCA – Bachelor of Computer Applications	SB7119	Microprocessor and Assembly Language	CO5	Identify in details with examples Interfacing I/o Devices
BCA – Bachelor of Computer Applications	SB7119	Microprocessor and Assembly Language	CO4	Identify in details with application, if applicable, Interfacing Memory
BCA – Bachelor of Computer Applications	SB7119	Microprocessor and Assembly Language	CO3	Write down the characteristics of Programming model and looping
BCA – Bachelor of Computer Applications	SB7120	Theory of Computation	CO1	Identify in depth Introduction to Finite Automata: The central concepts of Automata theory; Deterministic finite automata; Nondeterministic finite automata. An application of finite automata, Finite automata with Epsilon transitions
BCA – Bachelor of Computer Applications	SB7120	Theory of Computation	CO2	Deliberate the details of Regular Expressions: Finite Automata and Regular Expressions Applications of Regular Expressions. Regular languages; Proving languages not to be regular languages; Closure properties of regular languages
BCA – Bachelor of Computer Applications	SB7120	Theory of Computation	CO3	Understand the details of Context-free grammars: Parse trees; Applications; Ambiguity in grammars and Languages. Definition of the Pushdown automata; the languages of a PDA; Equivalence of PDA's and CFG's
BCA – Bachelor of Computer Applications	SB7120	Theory of Computation	CO5	Specify the classification and characteristics of The Turing machine: Programming techniques for Turing Machines. Undecidability, A Language that is not recursively enumerable
BCA – Bachelor of Computer Applications	SB7120	Theory of Computation	CO4	Specify in details with examples Deterministic Pushdown Automata: Normal forms for CFGs; The pumping lemma for CFGs; Closure properties of CFLs
BCA – Bachelor of Computer Applications	SB7120	Theory of Computation	CO6	Understand the classification and characteristics of The Turing machine: Programming techniques for Turing Machines. Undecidability, A Language that is not recursively enumerable
BCA – Bachelor of Computer Applications	SB7121	System Programming	CO1	Specify in details with examples Introduction of System Programming
BCA – Bachelor of Computer Applications	SB7121	System Programming	CO2	Specify the classification and characteristics of Assemblers, Pass 1 and Pass 2, Searching and sorting
BCA – Bachelor of Computer Applications	SB7121	System Programming	CO3	Features of Macro Processor, Data structures, databases, Pass1 and Pass 2 macro processor



BCA – Bachelor of Computer Applications	SB7121	System Programming	CO4	Specify the characteristics of Loaders, different loader schemes, dynamic linking and loading
BCA – Bachelor of Computer Applications	SB7121	System Programming	CO5	Understand the details of Compilers, stages of compilers with databases
BCA – Bachelor of Computer Applications	SB7122	Cryptography and Network Security	CO3	Deliberate the details of Encipherment using modern symmetric key ciphers
BCA – Bachelor of Computer Applications	SB7122	Cryptography and Network Security	CO4	Specify the classification and characteristics of Cryptography hash functions,SHA512,digital signatures,Kerberos
BCA – Bachelor of Computer Applications	SB7122	Cryptography and Network Security	CO5	Understand in details with examples Smime,PGP,SSL architecture,SSL Message format
BCA – Bachelor of Computer Applications	SB7122	Cryptography and Network Security	CO2	Identify the classification and characteristics of Traditional symmetric key ciphers,DES,AES
BCA – Bachelor of Computer Applications	SB7122	Cryptography and Network Security	CO1	Understand in details security goals,cryptographic attacks,services and mechanism,techniques
BCA – Bachelor of Computer Applications	SB7123	Web Programming	CO1	Understand the details of Fundamentals of web
BCA – Bachelor of Computer Applications	SB7123	Web Programming	CO2	Identify in depth HTML and XHTML
BCA – Bachelor of Computer Applications	SB7123	Web Programming	CO3	Specify the classification and characteristics of Java Script
BCA – Bachelor of Computer Applications	SB7123	Web Programming	CO4	Deliberate the details of Java Script and HTML documents
BCA – Bachelor of Computer Applications	SB7123	Web Programming	CO5	Deliberate in details with examples Dynamic documents with Java Script