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BACHELOR OF COMPUTER APPLICATIONS

(B.C.A.)

COURSE OUTCOMES

NATIONAL EDUCATION POLICY (NEP)

(2020 Batch onwards)

COURSE OUTCOMES (COs)

FIRST SEMESTER

Semester	**I SEMESTER**
Subject	**FUNDAMENTALS OF COMPUTERS**
Code	**CAC01**
Learning Objectives	**1.** To impart the knowledge about the evolution of computers, classification, various peripherals of computers, types of softwares etc. **2.** To introduce the number system and Boolean algebra. **3.** To enable the students to understand the design components of a digital subsystem that required for realizing the various components such as Register, Counter etc.
Learning Outcomes	After completing this course satisfactorily, a student will be able to: **CO1:** Understand the fundamentals of computer system **CO2:** Identify different components within the computer system **CO3:** Understand different types of input and output devices **CO4:** Demonstrate the working concepts of different devices connected to computer **CO5:** Explain different generations of programming languages and their significance **CO6:** Understand the use of Word processing, Spreadsheet, Presentation and DBMS applications **CO7:** Understand Digital computer and digital systems functioning

Semester	**I SEMESTER**
Subject	**PROGRAMMING IN C**
Code	**CAC02**
Learning Objectives	**1.** Designed to provide complete knowledge of C language. **2.** Students will be able to develop logic which will help them to create programs, applications in C. Also, by learning the basic programming constructs they can easily switch over to any other language in future.
Learning Outcomes	After completing this course satisfactorily, a student will be able to: **CO1:** Confidently operate Desktop Computers to carry out computational tasks **CO2:** Understand working of Hardware and Software and the importance of operating systems **CO3:** Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts **CO4:** Read, understand and trace the execution of programs written in C language **CO5:** Write the C code for a given problem **CO6:** Perform input and output operations using programs in C.

Semester	**I SEMESTER**
Subject	**MATHEMATICAL FOUNDATION**
Code	**CAC03**
Learning Objectives	To learn foundation of Mathematics like Algebra, Trigonometry, Calculus and Matrix Algebra.
Learning Outcomes	**CO1:** Study and solve problems related to connectives, predicates and quantifiers under different situations. **CO2:** Develop basic knowledge of matrices and to solve equations using Cramer's rule. **CO3:** Know the concept of Eigen values. **CO4:** To develop the knowledge about derivatives and know various applications of differentiation. **CO5:** Understand the basic concepts of Mathematical reasoning, set and functions

Semester	**I SEMESTER**
Subject	**INFORMATION TECHNOLOGY LAB**
Code	**CAC01P**
Learning Objectives	**1.** To learn MS Office Applications. **2.** To learn document creation in MS Word, MS Excel, MS PowerPoint and MS Access.
Learning Outcomes	After completing this course satisfactorily, a student will be able to: **CO1:** Compare and contrast various types of operating systems **CO2:** Explain the purpose of office automation **CO3:** Describe how information is stored and retried in/from computer memory **CO4:** Know about various types of office automation software and their applications **CO5:** Create document using word processing software **CO6:** Design presentation using presentation software **CO7:** Create worksheets using spreadsheet software **CO8:** Store and retrieve data in/from database management application

Semester	**I SEMESTER**
Subject	**C PROGRAMMING LAB**
Code	**CAC02P**
Learning Objectives	To learn the programming logic for problems with decision making, looping, arrays, structures and files.
Learning Outcomes	Upon the completion of this course, the students will be able to write programs with: **CO1:** Simple logic involving if, switch, for and while loops. **CO2:** Single- and two-dimensional arrays. **CO3:** User defined and recursive functions. **CO4:** Pointer concepts. **CO5:** Structures and files.

Semester	**I SEMESTER**
Subject	**KANNADA**
Code	**BCAKALN101**
Learning Objectives	□□□□□□ □□□□□□□□□□□□□□□c□□□□□□ □□□□□ □□□□□□□□ □□□□□□ □□□□□□□ □□□□□□□□□□
Learning Outcomes	ಕನ್ನ ಡ ಕಲಿಕೆಯಿಂದ ಗಣಕ ನಿಕಾಯದ ವಿದ್ಯಾ ರ್ಥಿಗಳು ಪಡೆಯುವ ಪ್ರ ಯೋಜನ್: **CO1:** ವಿವಿಧ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳ ರೂಪ ವೈಶಿಷ್ಟ್ಯ ರೂಪಗಳ ಬಗ್ಗೆ ತಿಳುವಳಿಕೆ ನೋಡುವುದು. **CO2:** ಸಾಹಿತ್ಯ ದ ಓದು, ತಿಳುವಳಿಕೆ ಹಾಗು ಬರವಣಿಗೆಗ್ಗೆ ಪ್ರೋರಣೆ ನೋಡುತ್ತ ದೆ. **CO3:** ಆಧುನಿಕ ತಂತ್ರ ಜ್ಞಾ ನ್ವಿಂಗ್ಗೆ ಭಾಷಾಕೌಶಲ್ಯ ವನ್ನು ವೃದ್ಧಿ ಸ್ಲು ನೆರವಾಗುತ್ತ ದೆ. **CO4:** ಸ್ಕಾಲೋನ್ ವಿದಾ ಮಾನ್ಯಳ ಅರಿವು ಮತ್ತ ನಾಡು ನುಡಿ ಚಿಂತ್ನೆಗ್ಗೆ ಒತ್ತನನ್ನುನೋಡುತ್ತ ದೆ. **CO5:** ಸಾಮಾಜಿಕ ಹೊಣೆಗಾರಿಕೆಯನುನ ಅರಿತ್ತ ಧಾರ್ಮಿಕ, ರಾಜಕೋಯ, ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯನುನ ಹೊಂದಲು ಪ್ರೋರೇಪಿಸುತ್ತ ದೆ.

Semester	**I SEMESTER**
Subject	**ENGLISH**
Code	**BCAENLN 101**
Learning Objectives	**1.** To develop the students' ability to listen, speak, read and write coherently about the literary, semi literary forms and engage in academic writing in English. **2.** To reinforce the vocabulary, grammatical structures and common usages in both written and spoken English and to strengthen their use of English in career related contexts. **3.** To provide opportunities for serious study of different kinds of writing in English through the study of prose, poetry, drama and novel, academic writing, essays, CVs and Creative advertisements. **4.** 4To encourage the students to express their views independently on academic and social contexts in the texts **5.** 5To inspire them to relate these contexts to evaluate and write on the current issues and real-life contexts
Learning Outcomes	**CO1:** Have considerable acquaintance with some of the best literary texts in English Comprehend the importance of language across the disciplines. **CO2:** Be able to attempt critical interpretation of meanings and references of literary texts. **CO3:** Display a self-directed understanding of high language and capability of self-expression. **CO4**: Be enabled with writing skills that are relevant and empowering in real life experiences in interview and professional fields, in everyday life.

Semester	**I SEMESTER**
Subject	**HINDI**
Code	**BCAHDLN 101**
Learning Objectives	कक्षा व्याख्यान,गतिविधि आधारित शिक्षण,सामूहिक चचा
Learning Outcomes	**CO1:** गध्य के वित्त के आधार पि किानी िचने की क्षमिा | **CO2:** िाचन कौिल िथा लेखन कौिल बढ़ेगा | **CO3:** हिन्दी कथा के बारे में जानकारी प्राप्त िोगी | **CO4:** प्रयोजन मूलक हिन्दी के अंिर्गकाि िाष्ट्रभाषा, िाजभाषा औि संपका भाषाप्राप्तिोगी

Semester	**I SEMESTER**
Subject	**ENVIRONMENTAL STUDIES**
Code	**AECC-1**
Learning Objectives	**1.** To Understand the responsibilities and identities as citizens, consumers and environmental actors in a complex world. **2.** To understand and evaluate the global scale of environmental problems
Learning Outcomes	**CO1:** Understand and evaluate the global scale of environmental problems **CO2:** Understand the role and responsibilities and identities as citizens, consumers and environmental actors in a complex interconnected world.

COURSE OUTCOMES (COs)

SECOND SEMESTER

Semester	**II SEMESTER**
Subject	**DATA STRUCTURES USING C**
Code	**CAC04**
Learning Objectives	**1.** Students will learn to program data structures and use them in implementations of abstract data types. **2.** To learn to implement primitive and non-primitive data structures.
Learning Outcomes	After completing this course, student will be able to: **CO1:** Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms **CO2:** Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs **CO3:** Write programs that use arrays, linked structures, stacks, queues, trees, and graphs **CO4:** Demonstrate different methods for traversing trees **CO5:** Compare alternative implementations of data structures with respect to performance **CO6:** Describe the concept of recursion, give examples of its use **CO7:** Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing

Semester	**II SEMESTER**
Subject	**OBJECT ORIENTED PROGRAMMING USING JAVA**
Code	**CAC05**
Learning Objectives	**1.** Students will learn the features of Java and the architecture of JVM. **2.** Students use the syntax and semantics of java programming language and basic concepts of OOP. **3.** Students learn concepts of exception handling mechanisms, work with swings and applets.
Learning Outcomes	After completing this course, the students **CO1:** Understand the features of Java and the architecture of JVM **CO2:** Write, compile, and execute Java programs that include basic data types and control flow constructs and how type casting is done **CO3:** Identify classes, objects, members of a class and relationships among them needed for a specific problem and demonstrate the concepts of polymorphism and inheritance **CO4:** The students write programs based on interfaces and threads and explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Language **CO5:** Write, compile, execute Java programs that include GUIs and event driven programming. **CO6:** Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes. **CO7:** Design event driven and web related applications which mimic the real-world scenarios.

Semester	**II SEMESTER**
Subject	**DISCRETE MATHEMATICAL STRUCTURES**
Code	**CAC06**
Learning Objectives	**1.** To learn the concepts in Mathematics like Set Theory, Logical Statements, Relations, Binary Trees.
Learning Outcomes	After completing this course satisfactorily, a student will be able to: **CO1:** To understand the basic concepts of Mathematical reasoning, set and functions. **CO2:** To understand various counting techniques. **CO3:** Understand the concepts of various types of relations, partial ordering and equivalence relations. **CO4:** To understand the concept of probability and mathematical induction. **CO5:** Familiarize the fundamental concepts of graph theory and shortest path algorithm. **CO6:** To understand the concept of binary tree representation

Semester	**II SEMESTER**
Subject	**DATA STRUCTURE LAB**
Code	**CAC04P**
Learning Objectives	The applications of various data structures in technologies.
Learning Outcomes	Upon the completion of this course, the students will be able to do the following: **CO1:** Sort and search the objects using various techniques. **CO2:** Using queue, stack, and linked list with various basic operations. **CO3:** Learning various operations on binary tree.

Semester	**II SEMESTER**
Subject	**JAVA LAB**
Code	**CAC05P**
Learning Objectives	To learn various concepts in JAVA practically.
Learning Outcomes	Upon the completion of this course, the students will be able to: **CO1:** Create programs using simple OOP concept. **CO2:** Use Thread applications **CO3:** Design applets. **CO4:** Design forms using swings. **CO5:** Prepare projects using JAVA with database connectivity.

Semester	**II SEMESTER**
Subject	**ENGLISH**
Code	**BCAENLN 201**
Learning Objectives	**1.** To acquaint the student with some of the exemplary pieces of writing in English **2.** To enable the student to comprehend life in its diverse dimensions through literature **3.** To strengthen the learner's vocabulary and descriptive writing skills **4.** To help the learner to overcome the most common mistakes in English usage. **5.** To empower the student with language skills most needed in professional fields.
Learning Outcomes	**CO1:** The student can read and understand prose and poetic passages by writers of different periods and places. **CO2:** The student can appreciate poetic/literary use of the English language. The student can locate ideas in the passages, summarize and write coherent paragraphs. **CO3:** The student is enabled to identify and correct errors in the usage of certain elements of grammar. **CO4:** The student internalizes the social values of equity, nationalism and humanist understanding of commercial activities

Semester	**II SEMESTER**
Subject	**HINDI**
Code	**BCAHDLN 201**
Learning Objectives	कक्षा व्याख्यान,गतिविधि आािरििशिक्षण,सामूहिक चचाा
Learning Outcomes	**CO1:** गध्य के िि के आाि पि किानी िचने की क्षमिा | **CO2:** िाचन कौिल िथा लेखन कौिल बढ़ेगा | **CO3:** हिन्दी कथा के बािे में जानकािी प्रापि िोगी | **CO4:** प्रयोजन मूलक हिन्दी के अंिर्गकाािि िाष्ट्रभाषा, िाजभाषा औ संपका भाषा प्रापि िोगी |

Semester	**II SEMESTER**
Subject	**KANNADA**
Code	**BCAKALN201**
Learning Objectives	[illegible] .
Learning Outcomes	ಕನ್ನ ಡ ಕಲಿಕೆಯಿಂದ ಗಣಕ ನಿಕಾಯದ ವಿದ್ಯಾ ರ್ಥಿಗಳು ಪಡೆಯುವ ಪ್ರ ಯೋಜನ್: **CO1:** ವಿವಿಧ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳ ರೂಪ ಸ್ವರೂಪಗಳ ಬಗ್ಗೆ ತಿಳುವಳಿಕೆ ನೀಡುವುದು. **CO2:** ಸಾಹಿತ್ಯ ದ ಓದು, ತಿಳುವಳಿಕೆ ಹಾಗು ಬರವಣಿಗೆಗೆ ಪ್ರೇರಣೆ ನೀಡುತ್ತ ದೆ. **CO3:** ಆಧುನಿಕ ತಂತ್ರ ಜ್ಞಾನದೊಂದಿಗೆ ಭಾಷಾಕೌಶಲ್ಯ ವನ್ನು ವೃದ್ಧಿ ಸಲು ನೆರವಾಗುತ್ತ ದೆ. **CO4:** ಸಮಕಾಲೀನ್ ವಿದ್ಯಾ ಮಾನಗಳ ಅರಿವು ಮತ್ತು ನಾಡು ನುಡಿ ಚಿಂತನೆಗೆ ಒತ್ತನುನೀಡುತ್ತ ದೆ. **CO5:** ಸಾಮಾಜಿಕ ಹೊಣೆಗಾರಿಕೆಯನುನ ಅರಿತ್ತ ಧಾರ್ಮಿಕ, ರಾಜಕೀಯ, ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯನುನ ಹೊಂದಲು ಪ್ರೇರೇಪಿಸುತ್ತದೆ.

Semester	**II SEMESTER**
Subject	**DIGITAL FLUENCY**
Code	**COMDFSN201**
Learning Objectives	**1.** To enable learner use digital tools to demonstrate learning or create original work. **2.** To demonstrate an ability to use freely available digital multimedia applications in developing, processing, and presenting information. **3.** To make use of available internet functions and web applications, social networks, communication tools, and search engines to facilitate academic work.
Learning Outcomes	At the end of the course the student should be able to **CO1:** Have an intelligent conversation on the key concepts and applications of Artificial Intelligence (AI), Big Data Analytics (BDA), Internet of Things (IoT), Cloud Computing, and Cybersecurity. **CO2:** Develop holistically by learning essential skills such as effective communication, problem-solving, design thinking, and teamwork. **CO3:** Build his/her personal brand as an agile and expansive learner – one who is interested in horizontal and vertical growth.

COURSE OUTCOMES (COs)
THIRD SEMESTER

Semester	**III SEMESTER**
Subject	**GENERIC ENGLISH**
Code	**BCAENLN301**
Learning Objectives	**1.** Students are expected to be able to read, comprehend and write short and long type answers on the prescribed One Act Plays **2.** Students are expected to be familiar with history, culture and life through a study of the prescribed One Act Plays **3.** Students are expected to be familiar with the structure and techniques used in theater and drama with specific reference to One Act Plays **4.** Students are expected to become proficient in writing cogent descriptive, reflective and argumentative essays. **5.** Students are expected to be able to create dialogues, write good letters of application and prepare their C Vs
Learning Outcomes	**CO1:** A student can read and appreciate novels and their social and aesthetic values. **CO2:** The student can interpret and analyze the situations and conflicts in the novels and connect them to real life situations. **CO3:** The student can critically examine the contexts, tones and undertones in spoken and written English. **CO4:** The student acquires the ability to read and write analytical passages, to comprehend and to infer from such writings. **CO5:** The student attains the ability to appreciate the use of English in modern printed advertisements and posters. **CO6:** Further, the student can use English creatively in modern contexts.

Semester	**III SEMESTER**
Subject	**HINDI**
Code	**BCAHDLN301**
Learning Objectives	**1.** गतितिति आिारि तिक्षण **2.** िचनात्मक अतिव्यक्ति
Learning Outcomes	**CO1:** □□□□ □□ □□□□□□ □□ □□□□ □□ □□□□ □□ □□□□□□ □□□□□□□□ □□□□ **CO2:** □□□□ □□□□ □□□ □□□□ □□□□ □□□ □□□□□□□□

Semester	**III SEMESTER**
Subject	**KANNADA**
Code	**BCAKALN302**
Learning Objectives	□□□□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□ □□□□ □□□□□□□□□□ □□□□□□□□□□□□□□□ □□□□□ □□□□□□□□□□ □□□□□□□□□□
Learning Outcomes	**CO1:** □□□ □□□□□□□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□□□□□□ □□□□□□□□□□□□□ □□□□□ □□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□ □□□□□□□□□□□□. **CO2:** □□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□□□ □□□□□□□□, □□□□ □□□□□□□□□□□□□□ □□□□□□ □□□□□□□□□□ □□□□□□□□□□□□□, □□□□□□□□□□□□□□□ □□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□ □□□□□□□□ □□□□□ □□□□□□

Semester	**III SEMESTER**
Subject	**DATABASE MANAGEMENT SYSTEMS**
Code	**BCACACN301**
Learning Objectives	**1.** To provide knowledge about RDBMS Concepts, SQL Concepts and PL/SQL Programming. **2.** To provide knowledge about database normalization and to learn theory behind data models and query Language.
Learning Outcomes	**CO1:** Understand the various database concepts and the need for database systems. **CO2:** Identify and define database objects, enforce integrity constraints on a database using DBMS. **CO3:** Demonstrate a Data model and Schemas in RDBMS. **CO4:** Identify entities and relationships and design ER diagrams for given real-world problems. **CO5:** Represent ER model to relational model and its implementation through SQL. **CO6:** Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation. **CO7:** Understand the transaction processing and concurrency control techniques.

Semester	**III SEMESTER**
Subject	**C# AND DOT NET FRAMEWORK**
Code	**BCACACN302**
Learning Objectives	**1.** Learn the syntax, data types, variables, and basic programming constructs in C#. **2.** Grasp concepts like loops, conditionals, functions, and error handling. **3.** Implement classes, objects, inheritance, and interfaces in C#. **4.** Develop console applications, Windows Forms, ASP.NET web applications, and services using C#.
Learning Outcomes	**CO1:** Ability to write, understand, and debug C# code. **CO2:** Implement logic using control structures and functions effectively. **CO3:** Proficient in creating classes, inheritance hierarchies, and interfaces. **CO4:** Proficiency in using development tools like Visual Studio for application creation. **CO5:** Interpret and Develop Interfaces for real-time applications. **CO6:** Build custom collections and generics in C#.

Semester	**III SEMESTER**
Subject	**COMPUTER COMMUNICATION & NETWORKS**
Code	**BCACACN303**
Learning Objectives	**1.** Learn basic concepts, OSI model, Services, Role of each layer. **2.** Learn TCP/IP model **3.** Networks devices and transmission media, **4.** Channel allocation, framing, error and flow control techniques **5.** Functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism. **6.** Different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism. **7.** Functions offered by session and presentation layer and their Implementation **8.** Different protocols used at application layer

Learning Outcomes	**CO1:** Learnt about Basic concepts, OSI reference model, services and role of each layer of OSI model and TCP/IP, Networks devices and transmission media. **CO2:** Able to Apply channel allocation, framing, error and flow control techniques. **CO3:** Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism. **CO4:** Able to explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism. **CO5:** Able to explain the functions offered by session and presentation layer and their Implementation. **CO6:** Able to explain the different protocols used at application layer

Semester	**III SEMESTER**
Subject	**DBMS LAB**
Code	**BCACAPN304**
Learning Objectives	**1.** Understand and demonstrate the ability to design and create database tables using appropriate data types and constraints. Practice inserting, updating, and retrieving data from tables, ensuring proficiency in basic **2.** Develop the skills to create and use PL/SQL programs effectively in a database, covering tasks like creating stored procedures, triggers, and functions to enhance the functionality of the system.
Learning Outcomes	**CO1:** Ability to design and create relational database tables, demonstrating proficiency in defining appropriate data types, constraints, and relationships. **CO2:** Acquire the skills to efficiently insert, update, and retrieve data from database tables, ensuring accurate and secure management of information in a real-world context. **CO3:** Develop expertise in creating and implementing complex PL/SQL programs, including stored procedures, triggers, and functions, to efficiently manage and enhance the functionality of a relational database

Semester	**III SEMESTER**
Subject	**C# AND DOT NET FRAMEWORK LAB**
Code	**BCACAPN305**
Learning Objectives	**1.** Understand and demonstrate knowledge of C# syntax, including variables, data types, operators, and control structures. **2.** Write simple C# programs to solve basic problems. **3.** Create classes, objects, and methods to model real-world scenarios. **4.** Develop console applications, Windows Forms applications, or simple ASP.NET web applications using C#. **5.** Understand the usage of Integrated Development Environments (IDEs) like Visual Studio. **6.** Implement error handling techniques using try-catch blocks to manage exceptions in C# code and understand the importance of handling errors gracefully in applications. **7.** Connect to databases using ADO.NET and Understand how C# interacts with databases through these frameworks.
Learning Outcomes	**CO1:** Ability to write, comprehend, and debug C# code with ease and Proficiency in applying basic programming constructs in C#. **CO2:** Capability to design and implement solutions using OOP principles in C#. **CO3:** Ability to create classes, interfaces, and inheritance hierarchies. Understanding of the .NET ecosystem and utilization of its core functionalities. **CO4:** Proficiency in creating various types of applications (console, Windows Forms, web) using C#. **CO5:** Capability to handle errors and exceptions effectively in C# applications. **CO6:** Ability to connect and manipulate databases using ADO.NET or Entity Framework in C# applications.

Semester	**III SEMESTER**
Subject	**OPEN-SOURCE TOOLS**
Code	**BCAOSSN301**
Learning Objectives	**1.** To develop proficiency in using open-source tools for various purposes like software development, data analysis, design, etc. **2.** To equip learners with practical skills, a deeper understanding of open-source principles, and the ability to contribute meaningfully to the open-source community while utilizing the vast array of tools available. **3.** To understand the values of openness, transparency, and community-driven development associated with open-source software. **4.** To recognize the benefits and features of Open-Source Technology and to interpret, contrast and compare open-source products among themselves. **5.** To use appropriate open-source tools based on the nature of the problem. **6.** Write code and compile different open-source software.
Learning Outcomes	**CO1:** Recognize the benefits and features of Open-Source Technology and to interpret, contrast and compare open-source products among themselves. **CO2:** Use appropriate open-source tools based on the nature of the problem. **CO3:** Write code and compile different open-source software.

COURSE OUTCOMES (COs)
FOURTH SEMESTER

Semester	**IV SEMESTER**
Subject	**GENERIC ENGLISH**
Code	**BCAENLN401**
Learning Objectives	**1.** Students are expected to be able to read, comprehend and write short and long type answers on the prescribed Novel **2.** Students are expected to be familiar with history, culture and life through a study of the prescribed Novel **3.** Students are expected to be familiar with the structure and techniques used in theatre and drama with specific reference to Novel **4.** Students are expected to become proficient in writing cogent descriptive, reflective and argumentative essays. **5.** Students are expected to be able to create dialogues, write good letters of application and prepare their C Vs
Learning Outcomes	**CO1:** A student can read and appreciate novels and their social and aesthetic values. **CO2:** The student can interpret and analyze the situations and conflicts in the novels and connect them to real life situations. **CO3:** The student can critically examine the contexts, tones and undertones in spoken and written English. **CO4:** The student acquires the ability to read and write analytical passages, to comprehend and to infer from such writings. **CO5:** The student attains the ability to appreciate the use of English in modern printed advertisements and posters. **CO6:** Further, the student can use English creatively in modern contexts.

Semester	**IV SEMESTER**
Subject	**HINDI**
Code	**BCAHDLN401**
Learning Objectives	**1.** सामूतिक चचाा **2.** नाटक मंचन
Learning Outcomes	**CO1:** □□□□□□□ □□□□□ □□□ □□□□□□□ □□ □□□□ **CO2:** □□□□□□□□ □□□□□□□□□ □□ □□□□□□ □□□□□□□□

Semester	**IV SEMESTER**
Subject	**KANNADA**
Code	**BCAKALN401**
Learning Objectives	□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□ □□□□ □□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□□ □□□□ □□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□□
Learning Outcomes	**CO1:** □□□□ □□□□□□□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□□□□□ □□□□□□□□□□□□□ □□□□□ □□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□ □□□□□□□□□□□□. **CO2:** □□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□□□ □□□□□□□, □□□□ □□□□□□□□□□□□□ □□□□□□ □□□□□□□□□□ □□□□□□□□□□□□, □□□□□□□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□ □□□□□□□ □□□□□ □□□□□□

Semester	**IV SEMESTER**
Subject	**PYTHON PROGRAMMING**
Code	**BCACACN401**
Learning Objectives	To study python fundamentals to advanced concepts like oops, exception handling, multi-threading, networking, database connectivity and graphical user interface.
Learning Outcomes	**CO1:** To be skilled at creating, debugging and testing a software application using the python programming language. **CO2:** To explain the basic concepts of python programming. **CO3:** To demonstrate proficiency in the handling of loops and creation of functions. **CO4:** To identify the methods to create and manipulate lists, tuples and dictionaries. **CO5:** To discover the commonly used operations involving file handling. **CO6:** To interpret the concepts of object-oriented programming as used in python. **CO7:** To develop the emerging applications of relevant fields using python.

Semester	**IV SEMESTER**
Subject	**COMPUTER MULTIMEDIA AND ANIMATION**
Code	**BCACACN402**
Learning Objectives	**1.** Grasp the fundamentals of multimedia elements such as text, images, audio, video, and animation. **2.** Learn about different multimedia formats and their characteristics. **3.** Understand image formats, resolution, color models, and image manipulation techniques. **4.** Understand audio/video formats, editing techniques, transitions, effects, and synchronization. **5.** Learn to create keyframes, use timelines, and understand animation curves. **6.** Explore tools and techniques for creating interactive multimedia content.
Learning Outcomes	**CO1:** Write a well-designed, interactive Web site with respect to current standards and practices. **CO2:** Demonstrate in-depth knowledge of an industry-standard multimedia **CO3:** Development tool and its associated scripting language. **CO4:** Determine the appropriate use of interactive versus standalone Web applications

Semester	**IV SEMESTER**
Subject	**OPERATING SYSTEM CONCEPTS**
Code	**BCACACN403**
Learning Objectives	To make students understand the purpose, role, structure, functions, application of operating systems, understand services provided by operating systems.
Learning Outcomes	**CO1:** To understand the fundamentals of the operating system. **CO2:** To comprehend multithreaded programming, process management, process synchronization, memory management and storage management. **CO3:** To compare the performance of scheduling algorithms **CO4:** To identify the features of i/o and file handling methods.

Semester	**IV SEMESTER**
Subject	**MULTIMEDIA AND ANIMATION LAB**
Code	**BCACAPN404**
Learning Objectives	**1.** Understand image manipulation techniques, layers, filters, and effects. **2.** Understand video/audio formats, editing techniques, transitions, and effects. **3.** Understand concepts of 3D modeling, texturing, rigging, and animation. **4.** Learn tools and techniques for creating interactive multimedia content. **5.** Learn project planning and management specific to multimedia projects.
Learning Outcomes	**CO1:** Capability to create and manipulate images effectively using graphic editing tools. **CO2:** Understanding of advanced image editing techniques for various purposes. **CO3:** Proficiency in editing audio and video content, applying effects, transitions, and synchronization. **CO4:** Proficiency in creating both 2D and basic 3D animations. **CO5:** Capability to plan, organize, and manage multimedia projects effectively.

Semester	**IV SEMESTER**
Subject	**PYTHON PROGRAMMING LAB**
Code	**BCACAPN405**
Learning Objectives	**1.** Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions. **2.** Work with user input to create fun and interactive programs. **3.** Visualize data in a variety of graphical formats.
Learning Outcomes	**CO1:** To understand and use variables **CO2:** To work with common Python data types like integers, floats, strings, characters, lists, dictionaries, as well as pandas DataFrames **CO3:** To use basic flow control, including for loops and conditionals **CO4:** To read data from text files **CO5:** To manipulate and extract data from pandas DataFrames **CO6:** To write Python code according to standard style guidelines

Semester	**IV SEMESTER**
Subject	**CONSTITUTION OF INDIA**
Code	**COMCOIN401**
Learning Objectives	**1.** To familiarize the students with the key elements of the Indian constitution. **2.** To enable students to grasp the constitutional provisions and values. **3.** To acquaint the students with the powers and functions of various constitutional offices and institutions. **4.** To make students understand the basic premises of Indian politics and role of constitution and citizen-oriented measures in a democracy
Learning Outcomes	At the end of the course the students will- **CO1:** Understand the key aspects of the Indian Constitution. **CO2:** Comprehend the structure and philosophy of the Constitution **CO3:** Understand the power and functions of various constitutional offices and institutions. **CO4:** Realise the significance of the constitution and appreciate the role of constitution and citizen-oriented measures in a democracy.

Semester	**IV SEMESTER**
Subject	**FINANCIAL EDUCATION AND INVESTMENT AWARENESS**
Code	**COMFISN401**
Learning Objectives	The students after undergoing the subject must be able to understand the foundation for finance such as financial planning, linking of life goals with financial goals, types of bank deposits, banking products, reading of financial statements, knowing the time value of money which are envisaged in the first module.
Learning Outcomes	**CO1:** Provide the foundations for financial decision making **CO2:** List out various saving and investment alternatives available for a common man **CO3:** Give a detailed overview of stock markets and stock selection **CO4:** Orient the learners about mutual funds and the criteria for selection

COURSE OUTCOMES (COs)
FIFTH SEMESTER

Semester	**V SEMESTER**
Subject	**DESIGN & ANALYSIS OF ALGORITHMS**
Code	**BCACACN501**
Learning Objectives	**1.** To familiarize students with basic graph algorithms and their efficiency analysis. **2.** To provide a detailed introduction to different algorithm design paradigms with illustrative problems. **3.** Analyze the asymptotic performance of algorithms. **4.** Ability to analyze asymptotic runtime complexity of algorithms including formulating recurrence relations. **5.** To understand and design algorithms using greedy strategy, divide and conquer approach, decrease and conquer approach, familiarize algorithms and data structures.
Learning Outcomes	**CO1:** Understand the fundamental concepts of algorithms and their complexity, including time and space complexity, worst-case and average-case analysis, and Big-O notation. **CO2:** Design algorithms for solving various types of problems, such as Sorting, Searching, and Graph traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy Techniques. **CO3:** Analyze and compare the time and space complexity of algorithms with other algorithmic techniques. **CO4:** Evaluate the performance of Sorting, Searching, Graph traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy Techniques using empirical testing and benchmarking, and identify their limitations and potential improvements. **CO5:** Apply various algorithm designs to real-world problems and evaluate their effectiveness and efficiency in solving them.

Semester	**V SEMESTER**
Subject	**STATISTICAL COMPUTING & R PROGRAMMING**
Code	**BCACACN502**
Learning Objectives	**1.** To make students exercise the fundamentals of statistical analysis in R environment. **2.** They would be able to analysis data for the purpose of exploration using descriptive and inferential statistics. **3.** Students will understand probability and sampling distributions and learn the creative application of linear regression in multivariate context for predictive purpose.
Learning Outcomes	**CO1:** Explore fundamentals of statistical analysis in R environment. **CO2:** Describe key terminologies, concepts and techniques employed in statistical analysis. **CO3:** Define calculate, implement probability and probability distributions to solve a wide variety of problems. **CO4:** Conduct and interpret a variety of hypothesis tests to aid decision making. **CO5:** Understand, analyze, and interpret correlation probability and regression to analyze the underlying relationships between different variables.

Semester	**V SEMESTER**
Subject	**SOFTWARE ENGINEERING**
Code	**BCACACN503**
Learning Objectives	**1.** To prepare students for successful careers in software engineering. **2.** To develop skills in software development systematically.
Learning Outcomes	**CO1:** How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment. **CO2:** An ability to work in one or more significant application domains. **CO3:** Work as an individual and as part of a multidisciplinary team to develop and deliver quality software. **CO4:** Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle. **CO5:** Demonstrate an ability to use the techniques and tools necessary for engineering practice.

Semester	**V SEMESTER**
Subject	**CLOUD COMPUTING**
Code	**BCACAEN501**
Learning Objectives	**1.** Define what cloud computing is and its key characteristics (on-demand, scalability, etc.). **2.** Understand different cloud service models: IaaS, PaaS, SaaS, and deployment models like public, private, hybrid, and multicloud. **3.** Understand the infrastructure components including compute, storage, networking, and security services in the cloud. **4.** Gain knowledge about security challenges and best practices in the cloud. **5.** Explore tools and techniques for monitoring and managing cloud resources.
Learning Outcomes	**CO1:** To explain the core concepts of the cloud computing paradigm such as how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. **CO2:** To apply the fundamental concepts in data centers to understand the trade-offs in power, efficiency and cost. **CO3:** To identify resource management fundamentals like resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing. **CO4:** To analyze various cloud programming models and apply them to solve problems on the cloud.

Semester	**V SEMESTER**
Subject	**DIGITAL MARKETING**
Code	**BCACAVN501**
Learning Objectives	**1.** To educate students in the area of Digital Marketing. **2.** To provides an understanding of the ever-evolving digital landscape and examines the strategic role of digital marketing processes and tools in designing the overall Marketing strategy and the Digital Marketing Plan. **3.** To explore the challenges of Interactive media, the online market place, and the creative challenges of communicating and retention strategies of customers through these media, the main search engines and the future trends in digital marketing.
Learning Outcomes	**CO1:** Understand the fundamental concepts and principles of digital marketing. **CO2:** Develop practical skills to implement various digital marketing strategies and techniques **CO3:** Analyze and evaluate the effectiveness of digital marketing campaigns. **CO4:** Apply critical thinking and problem-solving skills to real-world digital marketing scenarios. **CO5:** Create comprehensive digital marketing plans and strategies.

Semester	**V SEMESTER**
Subject	**EMPLOYABILITY SKILLS**
Code	**COMESSN501**
Learning Objectives	**1.** Identify and define problems systematically using structured approaches. **2.** Improve numerical and analytical abilities for effective data interpretation and decision-making. **3.** Enhance verbal and non-verbal reasoning skills through critical thinking exercises. **4.** Improve written & enhance oral communication skills, including presentation and interpersonal communication.
Learning Outcomes	**CO1:** Develop systematic problem-solving abilities. **CO2:** Improve numerical and analytical abilities. **CO3:** Enhance verbal and non-verbal reasoning skills. **CO4:** Enhance English language and communication skills.

Semester	**V SEMESTER**
Subject	**DESIGN & ANALYSIS OF ALGORITHMS LAB**
Code	**BCACAPN504**
Learning Objectives	**1.** To learn the importance of designing an algorithm in an effective way by considering space and time complexity **2.** To learn divide and conquer strategy-based algorithms **3.** To learn greedy method-based algorithms **4.** To learn the dynamic programming design techniques **5.** To develop Recursive backtracking algorithms **6.** To learn graph search and network flow algorithms
Learning Outcomes	**CO1:** Learnt the importance of designing an algorithm in an effective way by considering space and time complexity **CO2:** Learnt divide and conquer strategy-based algorithms **CO3:** Able to apply greedy method-based algorithms **CO4:** Understood dynamic programming design techniques **CO5:** Developed Recursive backtracking algorithms **CO6:** Learnt graph search and network flow algorithms

Semester	**V SEMESTER**
Subject	**R PROGRAMMING LAB**
Code	**BCACAPN505**
Learning Objectives	To make students exercise the fundamentals of statistical analysis in R environment. They would be able to analysis data for the purpose of exploration using Descriptive and Inferential Statistics. Students will understand Probability and Sampling Distributions and learn the creative application of Linear Regression in multivariate context for predictive purpose.
Learning Outcomes	**CO1:** To install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames. **CO2:** To describe key terminologies, concepts and techniques employed in Statistical Analysis. **CO3:** To define, Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems. **CO4:** To conduct and interpret a variety of Hypothesis Tests to aid Decision Making. **CO5:** To understand, Analyze, Interpret Correlation and Regression to analyze the underlying relationships between different variables.

COURSE OUTCOMES (COs)
SIXTH SEMESTER

Semester	**VI SEMESTER**
Subject	**PHP AND MYSQL**
Code	**BCACACN601**
Learning Objectives	**1.** To introduce the importance of PHP in web page design. **2.** Understanding the major elements of the PHP & MySQL **3.** To understand the features like functions, forms in PHP. **4.** How to prepare dynamic website. **5.** Learn how to take a static website and turn it into a dynamic website run from a database using PHP and MySQL. **6.** Analysing the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application. **7.** Learn how databases work and how to design one, as well as how to use php MyAdmin to work with MySQL. **8.** Learn different ways of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL Server and other data sources
Learning Outcomes	**CO1:** Utilizing the basic concept of statements and arrays in PHP.· **CO2:** Implement functions and browser handling power **CO3:** Imparting Database applications, File handling, Cookies in the webpage. **CO4:** Design and Implement Interactive Web Site using Forms, and OOPS. **CO5:** Create own web pages and deploy web pages.

Semester	**VI SEMESTER**
Subject	**ADVANCED JAVA AND J2EE**
Code	**BCACACN602**
Learning Objectives	**1.** To learn the concept of web applications using Servlets and Advanced Java Server Pages. **2.** To learn to develop applications using Session Beans and Entity Beans linked with Database. **3.** To learn to fetch data effectively from a database using tomcat Server. **4.** To learn to manage web sessions using Servlet and JSP. **5.** To learn server-side programming using Servlets and Java Server Pages. **6.** To learn to create dynamic web applications using JDBC and develop RMI programs. **7.** To learn to design Model View Controller programs.
Learning Outcomes	**CO1:** After completion of the course **CO2:** Students will learn to develop web applications with J2EE Technologies. **CO3:** Students will have hands-on experience to develop J2EE applications using Servlet, JSP. **CO4:** Students will learn to enhance logical reasoning and programming skills **CO5:** Students will learn to create efficient server-side programs **CO6:** Students will learn to build dynamic, interactive user interfaces

Semester	**VI SEMESTER**
Subject	**ARTIFICIAL INTELLIGENCE AND APPLICATIONS**
Code	**BCACACN603**
Learning Objectives	**1.** To augment human abilities by providing tools that enhance productivity and decision-making. **2.** To enable machines to understand, interpret, and respond to human language in a natural and useful way. **3.** To enhance decision-making processes through data analysis, pattern recognition, and predictive modeling. **4.** To create systems that can operate independently and perform tasks without human intervention. **5.** To develop AI systems that improve security measures and protect privacy. **6.** To foster economic growth and address social challenges through innovative AI solutions. **7.** To ensure AI technologies are developed and deployed ethically, responsibly, and in ways that respect human rights and values.
Learning Outcomes	**CO1:** Demonstrate a comprehensive understanding of AI concepts, history, and key subfields. **CO2:** Proficiency in using AI tools and programming languages such as Python, R, TensorFlow, and PyTorch. **CO3:** Effectively collect, clean, and preprocess data for AI applications. **CO4:** Understand and apply various machine learning techniques, including supervised, unsupervised, and reinforcement learning. **CO5:** Develop and implement deep learning models, including convolutional and recurrent neural networks. **CO6:** Utilize computer vision techniques to process and interpret visual data. **CO7:** Work effectively in teams and communicate AI concepts and findings to diverse audiences.

Semester	**VI SEMESTER**
Subject	**PHP AND MYSQL LAB**
Code	**BCACAPN604**
Learning Objectives	**1.** To design various webpages using PHP **2.** To learn data base concepts using MYSQL **3.** Connect data bases created using MYSQL into various webpages while developing web applications. **4.** To use form, OOP and files concepts in PHP.
Learning Outcomes	**CO1:** Students will learn to develop web pages using PHP & MYSQL **CO2:** Students will learn to apply various web development concepts and by making use of them create web pages students will learn to create efficient server-side programs **CO3:** Students will learn to connect databases created using MYSQL to web pages developed using PHP.

Semester	**VI SEMESTER**
Subject	**ADVANCED JAVA AND J2EE LAB**
Code	**BCACAPN605**
Learning Objectives	**1.** To prepare students with the ability to upgrade their skills on advanced programming tools and make them industry ready. **2.** to design and develop Web applications. **3.** to design Enterprise based applications by encapsulating an application's business logic. **4.** to design applications using pre-built frameworks.
Learning Outcomes	Student will be able to **CO1:** Design window based applications. **CO2:** Create a client and server communication using net package. **CO3:** Design reusable software components using java beans. **CO4:** Develop server side programming. **CO5:** Develop the dynamic web pages using JSP. **CO6:** Invoke the remote methods in an application using Remote Method Invocation (RMI) **CO7:** Access database through Java programs, using Java Data Base Connectivity (JDBC)

Semester	**VI SEMESTER**
Subject	**FUNDAMENTALS OF DATA SCIENCE**
Code	**BCACAEN601**
Learning Objectives	**1.** Ability to understand the role of data mining in knowledge discovery process. **2.** To familiarize with various data mining functionalities and how it can be applied to various real-world problems. **3.** To learn about finding data characteristics and evaluating the outcome of data mining process. **4.** To familiarize with various machine learning algorithms used in data mining. **5.** To learn about the importance of proper data management. **6.** To understand and implement classical models and algorithms in data warehouses and data mining
Learning Outcomes	**CO1:** Able to understand the functionality of the various data mining and data warehousing component. **CO2:** Able to understand warehousing architectures and tools for systematically organizing large database and use their data to make strategic decisions. **CO3:** Able to understand KDD process for finding interesting pattern from warehouse. **CO4:** Able to remove redundancy and incomplete data from the dataset using data preprocessing methods. **CO5:** Able to characterize the kinds of patterns that can be discovered by association rule mining. **CO6:** Able to discover interesting patterns from large amounts of data to analyze for predictions and classification. **CO7:** Able to develop a data mining application for data analysis using various tools.

Semester	**VI SEMESTER**
Subject	**WEB CONTENT MANAGEMENT SYSTEM**
Code	**BCACAVN601**
Learning Objectives	**1.** To understand content development basics **2.** To gain Knowledge of tools for multimedia content development for audio/ video, graphics, animations, presentations, screencasting **3.** Learn to host websites and develop content for social media platforms such as wiki and blog. **4.** To understand e-publications and virtual reality **5.** Use of e-learning platform Moodle and CMS applications Drupal and Joomla
Learning Outcomes	**CO1:** Able to understand Content Development Fundamentals **CO2:** Ability to use Multimedia Tools **CO3:** Ability to Host a website and Social Media Content Development **CO4:** Ability to develop E-Publications and Virtual Reality **CO5:** Ability to use and develop E-Learning and CMS Applications

Semester	**VI SEMESTER**
Subject	**MINI PROJECT**
Code	**BCAPRON601**
Learning Objectives	**1.** To enable student analytical and practical exposure by giving hands on experience with learned knowledge through different courses. **2.** To manage a simple project and be able to contribute to a more complex project as a team member **3.** To prepare the student to efficiently handle the main project for better output.
Learning Outcomes	**CO1:** Able to identify a problem and gather its requirements. **CO2:** Able to design a solution of the problem using latest tools & techniques. **CO3:** Able to develop a project using latest technology. **CO4:** Able to develop professional skills and critical thinking to prepare for major project. **CO5:** Able to demonstrate an ability to present project works to the evaluators.