

**MANGALORE UNIVERSITY**

**Bachelor of Computer Applications**

**Programme Outcomes**

**Programme Specific Outcomes**

**Course Objectives**

**Course Outcomes**

## **POs, PSOs, COs**

### **Programme: Bachelor of Computer Applications**

#### **Programme Outcomes (POs)**

- PO1 Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.
- PO2 Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.
- PO3 Ability to understand management and computing principles with computing knowledge to manage projects in multidisciplinary environments.
- PO4 Ability to work as a member or leader in diverse teams in multidisciplinary environment.

#### **Programme Specific Outcomes (PSOs)**

- PSO1 Computational knowledge and skill to understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.
- PSO2 Problem Analysis: Ability to identify, critically analyse and formulate complex computing problems using fundamentals of computer science and application domains.
- PSO3 Conduct Investigations of Complex Computing Problems: Ability to devise and conduct methods, interpret data and provide well informed conclusions.
- PSO4 Ability to select modern computing tools, skills and techniques necessary for innovative software solutions.
- PSO5 Innovation and Entrepreneurship: Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

## **Course Objectives and Course Outcomes**

### **BCAC131: Fundamentals of Information Technology**

#### **Course Objective**

- To impart the knowledge about the evolution of computers, classification, various peripherals of computers, types of software, etc.

#### **Course Outcome**

Upon successful completion of the course, the student will be able to

- Identify various devices and their working principles.

### **BCAC132: Problem Solving Using C**

#### **Course Objective**

- To develop skills in solving problems, to obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

#### **Course Outcome**

Upon successful completion of the course, the student will be able to

- Apply programming knowledge to create solutions to challenging problems, including specifying, designing, implementing and validating solutions for new problems.

### **BCAC133: COMPUTER ORGANISATION**

#### **Course Objectives**

- To introduce the number system and Boolean algebra.
- To understand the design components of a digital subsystem that required realizing various components such as register, counter, etc.

#### **Course Outcome**

Upon successful completion of the course, the student will be able to understand

- Different number systems, Boolean algebra concepts, various design components of Computer system like logical gates, registers, counters.

### **BCACE 136-E1: Internet Basics & HTML**

#### **Course Objectives**

- To provide knowledge about basic concepts of internet and its applications and about various Internet tools available.
- To learn HTML instructions to develop simple web pages.

#### **Course Outcomes**

Upon successful completion of the course, the student will be able to

- Understand features of Internet and email.
- Develop Simple web pages using HTML & style sheets.

**BCACE 137-E2: CLOUD COMPUTING**

**CourseObjectives**

- To introduce Cloud Computing, provide knowledge about basic concepts of cloud types, services and deployment models.
- To provide knowledge about cloud data storage.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Analyse the cloud computing setup with its vulnerabilities and applications.
- Assess cloud storage systems and cloud security, the risks involved, its impact and develop cloud application.

**BCAC 181: BASIC MATHEMATICS**

**CourseObjective**

To study Foundation of mathematics like Algebra, Trigonometry, Calculus, Set Theory, Logical Statements, Relations and Matrix Algebra.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Understand the foundations of mathematics, Perform computations in mathematics.
- Develop problem-solving skills required for Computer Applications.

**BCAC 182: OBJECT ORIENTED PROGRAMMING USING C++**

**CourseObjective**

To understand concept of Object Oriented Programming and create software applications using OOP concept.

**CourseOutcome**

Upon successful completion of the course, the student will be able to

- Understand how to apply the major object-oriented concepts to implement object oriented programs in C++.

**BCAC 183: Database Concepts and Oracle**

**CourseObjectives**

- To provide knowledge about RDBMS Concepts, SQL Concepts and PL/SQL Programming.
- To provide knowledge about database normalisation and to learn theory behind data models and query Languages.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- To describe data models and schemas in DBMS
- To understand the features of database management systems and relational database.
- To demonstrate an understanding of the relational data model and use SQL.

- To understand the functional dependencies and use SQL solutions to a broad range of query and data update problems.

### **BCACE 186: -E1: Internet of Things**

#### **CourseObjective**

To learn Basic concepts behind IoT and to study design principles for connected devices, IoT communication protocols, internet based connectivity, Sensor technologies and Sensor data Communication protocols

#### **CourseOutcome**

Upon successful completion of the course, the student will be

- Aware of Technology behind IoT, Design Principles for Connected devices, IoT communication protocols and internet based communication.

### **BCACE 187-E2: Big Data Analytics**

#### **CourseObjectives**

- To provides an overview of approaches facilitating data analytics on huge datasets.
- To introduce various Technologies for Handling Big Data.

#### **CourseOutcomes**

Upon successful completion of the course, the student will be able to understand

- Basic Concept of Big Data.
- Hoop Ecosystem, Role of Hbase and MapReduce Frame work.

### **BCACE 188: Artificial Intelligence**

#### **CourseObjectives**

- To provide a strong foundation of fundamental concepts in *Artificial Intelligence*
- To enable the student to apply these techniques in applications which involve perception, reasoning and learning.

#### **CourseOutcomes**

Upon successful completion of the course, the student will be

- Aware various searching techniques, constraint satisfaction problem and example problems
- Able to apply these techniques in applications which involve perception, reasoning and learning.
- Having knowledge of real world knowledge representation.

### **BCAC 231: OPERATING SYSTEM & LINUX**

#### **CourseObjective**

- To make students understand the purpose, role, structure, functions, application of operating systems, Understand services provided by operating systems and to study Linux file system and commands.

**CourseOutcomes**

Upon successful completion of the course, the student will be

- Able to analyse the structure of OS and basic architectural components involved in design.
- Able to analyse the various resource management techniques conceptualize the components involved in designing a contemporary operating system.
- Having Linux operating system basics

**BCAC 232: DATA STRUCTURES**

**CourseObjectives:**

- To choose the appropriate data structure and algorithm design method for a specified application.
- To learn the systematic way of solving problems, various methods of organizing large amounts of data.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Describe the usage of various data structures.
- Choose the appropriate data structure to solve a programming problem.
- Demonstrate various methods of organizing large amounts of data.

**BCAC 233: VISUAL BASIC .NET PROGRAMMING**

**CourseObjective**

- To learn programming with graphical interface using object oriented concept.

**CourseOutcome**

Upon successful completion of the course, the student will be able

- To developmental skill in VB .NET framework, tools, programming and connectivity with databases.

**BCACE 236-E1: HARDWARE AND PC MAINTENANCE**

**CourseObjectives**

- To build and maintain computer systems, desktops, and peripherals.
- To learn installing, diagnosing, repairing, maintaining, and upgrading software.

**CourseOutcomes**

Upon successful completion of the course, the student will be aware of

- Assembling computer systems.
- Installing various operating systems and other software.
- Trouble shooting computer systems.

**BCACE 237-E2: DESKTOP PUBLISHING**

**CourseObjective**

- To understand Documentation using DTP software tools like Page Make, CorelDRAW.

**CourseOutcome**

Upon successful completion of the course, the student will be

- Able to produce documentation with combination of Text, Audio, Video and Images in standard format.

**BCACE 238-E3: Excel Programming with VBA**

**CourseObjectives**

- To understand programming in Excel.
- To familiarize Excel Macros.
- To create Excel UserForms.

**CourseOutcomes**

Upon successful completion of the course, the student will be

- Create WorkBooks with customized Macros.
- Implement UserForms with different classes of controls.
- Design WorkBook with different functionality.

**BCAC 281: Computer Graphics and Animation**

**CourseObjective**

To learn about various technologies in computer graphics, animation and virtual reality system.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Draw primitive graphical shapes and perform transformation techniques programatically.
- Understand various new technologies developed and their applications.

**BCAC 282: Java Programming**

**CourseObjectives**

- To understand pure object-oriented programming paradigm.
- To familiarize with the fundamentals of Java features.
- To introduce console and GUI based applications using Java.
- To know the basic approaches to the design of software applications.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Understand the structure and model of the Java programming language.
- Use the Java programming language for various programming technologies.
- Develop software using the Java programming language.
- Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and operating systems.

**BCAC 283-E1: Data Mining**

**CourseObjectives**

- To introduce students to the basic concepts and techniques of Data Mining.
- To study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems.
- To develop and apply critical thinking, problem-solving, and decision-making skills.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Understand various Data Mining concepts, Association rules and Clustering techniques, Web mining concepts and decision trees.
- Select and implement data mining techniques suitable for the applications under consideration.

**BCAC 284-E2: COMPUTER ORIENTED NUMERICAL ANALYSIS**

**CourseObjective**

- To provide conceptual understanding of various numerical methods, in particular, with reference to numerical solution of non-linear equations and system of linear equations, interpolation, numerical differentiation and integration and numerical solution of ordinary differential equations.

**CourseOutcomes**

At the end of the course students will be able to

- Solve an algebraic or transcendental equation using an appropriate numerical method.
- Solve a differential equation using an appropriate numerical method.
- Solve a linear system of equations using an appropriate numerical method.
- Apply numerical concepts in coding.

**BCAC 285-E3: Business Mathematics & Statistics**

**CourseObjective**

- To learn basic mathematical concepts like Set Theory, Vector Algebra, Calculus and basic concepts in Statistics and Probability.

**CourseOutcome**

Upon successful completion of the course, the student will be able to

- Understand and apply analytical procedures used in Business Analytics.

**Elective -IV: Other Domain/Discipline**

**BCAOE 288-E1: Fundamentals of ICT**

**CourseObjectives**

- To make the students understand and learn the basics of computer for its effective use in day to day life.



**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Apply knowledge of computing analyse a problem, and identify and define the computing requirements appropriate to its solution.
- Design, implement, and evaluate a computer based system, process, component, or program to meet desired needs.

**Elective -IV: Other Domain /Discipline**

**BCAOE 289-E2: E-COMMERCE**

**CourseObjectives**

- Introduce concepts and principles E-commerce, modern technologies used to simplify business and banking processes through e- commerce, provision of E-commerce services.

**CourseOutcomes**

Upon successful completion of the course, the student will be acquainted with

- The principles and practice of Electronic Commerce
- The components, functions and roles of the Electronic Commerce environment
- E-Commerce payment systems.

**BCAC 331: Software Engineering**

**CourseObjectives**

- To prepare students for successful careers in *software engineering* and graduate education with a thorough understanding of *software engineering*.
- To develop skills in software development so as to enable to take up self.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Be successful professionals in the field with fundamental knowledge of software engineering.
- Analyse and resolve information technology problems through the application of systematic approaches and diagnostic tools.

**BCAC 332: Computer & Communication Networks**

**CourseObjectives**

- To introduce students to computer networks and concentrates on building a firm foundation for understanding Data Communications and Computer Networks.
- To introduce the student to the major concepts involved in wide-area networks (WANs),
- Local area networks (LANs) and Wireless LANs (WLANs).

**CourseOutcomes**

- Upon successful completion of the course, the student will be able to

- Understand the architectural principles of computer networking and compare different approaches to organising networks
- Explain key networking protocols and their hierarchical relationship in the context of a conceptual model such as the OSI and TCP/IP framework
- Identify core networking and infrastructure components and the roles they serve.

### **BCAC 333: Distributed Computing**

#### **Course Objectives**

- To study concurrent, Client Server, distributed paradigms
- To learn Interposes Communication and Remote procedure calls.

#### **Course Outcomes**

Upon successful completion of the course, the student will be able to

- Understand Concepts behind Distributed Systems
- Design and build application programs on distributed systems.
- Develop, test and debug RPC based client-server programs

### **BCAC 334: Web Technology**

#### **Course Objectives**

- To educate students in web application development and make them aware on programming web application in different technologies like ASP .NET with C# and PHP
- To provide in-depth understanding of the tools and technologies necessary for Web application design and development.
- To make the students understand client side scripting like HTML, server side scripting like ASP, PHP and database interfacing.

#### **Course Outcomes**

Upon successful completion of the course, the student will be able to

- Have a sound knowledge of Web Application Terminologies, Internet Tools
- Select and apply mark-up languages for processing, identifying, and presenting information in web pages.
- Use scripting languages and web services to add interactive components to web pages. Design and implement websites with good aesthetic sense of designing
- Design to be reusable the software components in a variety of different environments.

### **BCAC 335: Python Programming**

#### **Course Objectives**

- To Study Python Fundamentals to advanced concepts like OOPS, Exception handling, multi-threading, Networking, Database Connectivity and Graphical User Interface

**Courseoutcome**

Upon successful completion of the course, the student will be able to

- Be skilled at creating, debugging and testing a software application using the Python programming language.

**BCAC 336-E1: Account & Financial Management**

**CourseObjectives**

- To provide Basic knowledge of Accounting, competency to enter accounting transactions in the accounting software and generate different accounting reports/documents.
- Abilities to make cost analysis reports, profit & loss accounts, balance sheets, and cash flow statements, etc.
- Skills in maintaining accounting records, provides in-depth exposure to accounts receivable/ accounts payable, payroll and inventory modules.

**CourseOutcomes**

- Apply skills in Computerized Accounting for maintaining accounting records, making management decisions, and processing common business applications.

**BCAC 337-E2: Android Application Development**

**CourseObjectives**

- To provide the basic knowledge about mobile application development in Android platform.
- To make the students aware about how to build applications to mobile devices and thus preparing them to be ready for the industry.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Apply the skills for creating, deploying Android applications, with particular emphasis on software engineering topics including software architecture, software process, usability, and deployment.
- Use the knowledge of Android architecture and the tools for developing android applications.

**BCAC 338-E3: SCI LAB PROGRAMMING**

**CourseObjectives**

- Familiarization of the syntax, semantics, data-types and library functions of numerical computing language such as MATLAB and/or SCILAB, and application of such languages for implementation/simulation and visualization of basic mathematical functions relevant to electronics applications.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Understand the need for simulation/implementation for the verification of mathematical functions.

- Understand the main features of the SCILAB program development environment to enable their usage in the higher learning.
- Analyse the program for correctness and determine/estimate/predict the output and verify it under simulation environment using /SCILAB tools.

### **BCAC 381: E-COMMERCE**

#### **CourseObjective**

- Introduce concepts and principles E-commerce, modern technologies used to simplify business and banking processes through e-commerce, provision of E-commerce services, infrastructure, frameworks of web based and mobile systems for E-Commerce applications

#### **CourseOutcomes**

Upon successful completion of the course, the student will be able to understand

- The principles and practice of Electronic Commerce.
- The components, functions and roles of the Electronic Commerce environment E-Commerce payment systems.

### **BCAC 382: Network Security & Management**

#### **CourseObjectives**

- To provide in-depth knowledge of network Security, Database Security, information Security and Security laws.
- Provide knowledge Basic cryptography Concepts.
- To provide knowledge of Network Security Management.

#### **CourseOutcomes**

Upon successful completion of the course, the student will be able acquainted with

- Various factors driving the need for network , Database and information security.
- Physical points of vulnerability in a networks.
- Various laws related to Information Security.

### **BCAC 383: Software Testing**

#### **CourseObjectives**

- To understand the necessity of software testing.
- To analyse risks associated with software testing.
- To familiarize with different tools available for software testing

#### **CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Understand the importance of software testing, different testing techniques and use of various test tools
- Create test strategies and plans, design test cases, prioritize and execute them.

- Contribute to efficient delivery of software solutions and implement improvements in the software development processes.

### **BCAC 384-E1: Programming for Analytics**

#### **CourseObjectives**

- This module introduces Students to various programming languages in the field of Analytics like SQL, SAS, R and form foundation for further analysis of Datasets.
- Students will learn the basics of these programming languages and learn data manipulation techniques.

#### **CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Obtain, clean/process and transform data
- Analyse and interpret data using an ethically responsible approach.
- Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues. Formulate and use appropriate models of data analysis to solve hidden solutions to business related challenges.

### **BCAC 385-E2: Multivariate Data Analysis**

#### **CourseObjectives**

- To enable students to exercise Multivariate Techniques in R environment in different Business Cases.
- To know the different techniques covered under the scope of Multivariate Analysis and will be able to apply and build select Predictive Models in the context of Binary Classification and Time Series.

#### **CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Obtain, clean/process and transform data.
- Analyse and interpret data using an ethically responsible approach.
- Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues. Formulate and use appropriate models of data analysis to solve hidden solutions to business related challenges.

### **BCAC 386-E3: Business Statistics with R**

#### **CourseObjectives**

- To make students exercise the fundamentals of statistical analysis in R environment.
- To enable to analyse data for the purpose of exploration using descriptive and inferential statistics.
- To understand probability and sampling distributions and learn the creative application of linear regression in multivariate context for predictive purpose.

**CourseOutcomes**

Upon successful completion of the course, the student will be able to

- Obtain, clean/process and transform data
- Analyse and interpret data using an ethically responsible approach.
- Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues. Formulate and use appropriate models of data analysis to solve hidden solutions to business related challenges.