



**BISHOP HEBER COLLEGE (AUTONOMOUS)**  
**TIRUCHIRAPPALLI – 620017**  
**TAMILNADU, INDIA**

# **COURSE OUTCOMES**

**DEPARTMENT  
OF  
COMPUTER  
APPLICATIONS**



# BISHOP HEBER COLLEGE (AUTONOMOUS)

## TIRUCHIRAPPALLI – 620017

### TAMILNADU, INDIA

#### STRUCTURE OF THE SYLLABUS

PROGRAM NAME	COURSE	COURSE CODE	COURSE NAME
BCA Computer Applications	Core I	U21CA101	Programming in C
BCA Computer Applications	Core Practical I	U21CA1P1	Programming in C Lab
BCA Computer Applications	Core II	U21CA202	Programming in JAVA
BCA Computer Applications	Core Practical II	U21CA2P2	Programming in JAVA Lab
BCA Computer Applications	Core III	U21CA303	Programming in Python
BCA Computer Applications	Core Practical III	U21CA3P3	Programming in Python Lab
BCA Computer Applications	Allied IV	U21CA3Y4	Digital Computer Fundamentals
BCA Computer Applications	SBEC I	U21CA3S1	Internet Programming
BCA Computer Applications	NMEC I	U21CA3E1	MS Office-Word & Power Point
BCA Computer Applications	Core IV	U21CA404	Database Concepts
BCA Computer Applications	Core Practical IV	U21CA4P4	Database Concepts Lab
BCA Computer Applications	Allied V	U21CA4Y5	Microprocessor & Computer Architecture and Organization
BCA Computer Applications	Allied VI	U21CA4Y6	Introduction to Internet of Things
BCA Computer Applications	NMEC II	U21CA4E2	MS Office-Excel
BCA Computer Applications	Core V	U21CA505	Programming in ASP.NET with C#
BCA Computer Applications	Core VI	U21CA506	Operating Systems
BCA Computer Applications	Core VII	U21CA507	Fundamentals of Data Structures and Algorithms
BCA Computer Applications	Core Practical V	U21CA5P5	Programming in ASP.NET with C# Lab



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BCA Computer Applications	Elective I	U21CA5:1	Software Engineering and Testing
BCA Computer Applications	Elective I	U21CA5:2	Multimedia System Design
BCA Computer Applications	Elective I	U21CA5:3	Organizational Behaviour
BCA Computer Applications	SBEC II	U21CAPS2	Soft Skills (Oral and Written Communication)
BCA Computer Applications	Core VIII	U18CA608	Programming in PHP
BCA Computer Applications	Elective II	U21CA6:1	Computer Networks
BCA Computer Applications	Elective II	U21CA6:2	Data Warehousing and Data Mining
BCA Computer Applications	Elective II	U21CA6:3	E-Commerce– Framework, Technologies and Applications
BCA Computer Applications	Core Practical VIII	U21CA6P6	Programming in PHP Lab
BCA Computer Applications	Elective III	U21CA6:4	Fundamentals of Machine Learning
BCA Computer Applications	Elective III	U21CA6:5	Big Data Analytics
BCA Computer Applications	Elective III	U21CA6:6	Cloud Computing
BCA Computer Applications	Core Project	U21CA6PJ	Project Work
BCA Computer Applications	SBEC III	U21CA6S3	Programming in Android



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**Core - I: PROGRAMMING IN C**

**SEMESTER: I**  
**CREDITS:4**

**CODE: U21CA101**  
**HOURS/WEEK: 7**

**At the end of this course, the students will be able to**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
<b>CO1</b>	Explain the fundamentals of C Language.	K2	I
<b>CO2</b>	Identify the use of different types of operators, IO and other library functions.	K4	II
<b>CO3</b>	Apply the appropriate loop and decision-making statement to solve a problem.	K3	III
<b>CO4</b>	Justify the usage of array data structure and string functions in c programs	K5	III
<b>CO5</b>	Categorize user defined function, structure and union to solve the problems.	K4	IV
<b>CO6</b>	Create C Programs using pointers and files	K6	V

**Core Practical - I: PROGRAMMING IN C LAB**

**SEMESTER: I**  
**CREDITS:4**

**CODE: U21CA1P1**  
**HOURS/WEEK:4**

**At the end of this course, the students will be able to**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Exercise</b>
CO1	Demonstrate the execution of C programs.	K2	1-9
CO2	Build programs with the appropriate loop and decision-making statements to solve problems.	K2	2,3,4
CO3	Apply different matrix operations on arrays.	K3	6
CO4	Construct C programs using functions.	K6	7,8,9,10
CO5	Develop C programs using string operations.	K6	10
CO6	Create a C program with various file processing operations.	K6	13



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**Core - II: PROGRAMMING IN JAVA**

**SEMESTER: II**  
**CREDITS:4**

**CODE:U21CA202**  
**HOURS/WEEK: 4**

**After the successful completion of the course the students will be able to:**

CO No.	Course Outcomes	Level	Unit
CO1	Summarize the concepts of OOPS and basic elements of programming in Java.	K2	I
CO2	Demonstrate the creation of classes with data members, constructors and methods.	K2	II
CO3	Apply the concept of Inheritance using derived classes, packages and interfaces.	K3	III
CO4	Explain the need and usage of exception handling methods and threads.	K5	IV
CO5	Construct Java applet programs using Applet class methods.	K6	V
CO6	Elaborate on the usage of AWT controls and their listeners.	K6	V

**Core Practical- II: PROGRAMMING IN JAVA LAB**

**SEMESTER: II**  
**CREDITS:3**

**CODE: U21CA2P2**  
**HOURS/WEEK:3**

**After the successful completion of the course the students will be able to:**

CO No.	Course Outcomes	Level	Exercise
CO1	Develop a code with classes, objects and members of a class to solve a specific problem.	K3	I
CO2	Construct a java program using method overloading and inheritance.	K6	II
CO3	Explain the usage of packages and interfaces.	K5	III
CO4	Apply exception handling mechanism to handle runtime errors.	K3	III
CO5	Analyze the execution of multithreads in java.	K4	IV
CO6	Design an applet program using AWT controls.	K6	V



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**Core - III: PROGRAMMING IN PYTHON**

**SEMESTER: III**  
**CREDITS:4**

**CODE: U21CA303**  
**TOTAL HOURS:5**

**After the successful completion of the course the students will be able to:**

CO No.	Course Outcomes	Level	Unit
CO1	Explain the basic principles and elucidate the syntax and semantics of python programming language.	K2	I
CO2	Interpret the procedural statements like loops and functions with examples.	K5	II
CO3	Construct programs using string methods.	K6	II
CO4	Create programs by utilizing the list data structure.	K6	III
CO5	Build applications using dictionary, tuples and articulate object-oriented concepts such as encapsulation and inheritance.	K6	IV
CO6	Develop applications using regular expressions, protocols, python libraries and database to retrieve data from the web.	K6	V

**Core Practical - III: PROGRAMMING IN PYTHON LAB**

**SEMESTER: III**  
**CREDITS: 4**

**CODE: U21CA3P3**  
**HOURS/WEEK : 5**

**After the successful completion of the course the students will be able to:**

CO No.	Course Outcomes	Level	Exercise
CO1	Develop programs using numbers, math functions and string functions in Python	K3	1,2,3,4
CO2	Construct decision making and looping statements for problem solving.	K6	2,3,4
CO3	Apply the concepts of object-oriented programming in Python.	K3	3
CO4	Create applications the uses of Lists, Tuples and Dictionaries in Python.	K6	6,7
CO5	Develop applications that employ various file handling operations.	K6	7,8
CO6	Create networked programming concepts using urllib and regular expressions	K6	9





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**Allied - IV: DIGITAL COMPUTER FUNDAMENTALS**

**SEMESTER: III**

**CREDITS: 3**

**CODE: U21CA3Y4**

**HOURS/WEEK: 5**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Translate number conversions from one number system to another.	K2	I
CO2	Examine logical expressions, basic gates and universal gates.	K4	II
CO3	Construct adder, subtracter, multiplexer and flip-flops.	K3	III
CO4	Design arithmetic circuits, combinational circuits and flip-flops.	K6	III
CO5	Differentiate various types of registers, counters and memories.	K4	IV
CO6	Build analog to digital convertor and digital to analog convertor.	K6	V

**SBEC - I: INTERNET PROGRAMMING**

**SEMESTER : III**

**CREDITS:2**

**CODE: U21CA3S1**

**HOURS/WEEK: 2**

**At the end of this course, the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Elaborate on the page structure of HTML5 and examine the linking of web pages.	K6	I
CO2	Create different layouts on the web pages using CSS3.	K6	II
CO3	Build dynamic applications with java script code.	K6	III
CO4	Develop interactive and dynamic web pages with events.	K6	III
CO5	Conclude on the Document Object Model and apply XML to web pages.	K5	IV
CO6	Construct web pages with XML and XSLT.	K6	IV



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**NMEC – I: MS Office-Word and PowerPoint**

**SEMESTER: III**  
**CREDITS: 2**

**CODE: U21CA3E1**  
**HOURS/WEEK: 2**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Demonstrate competency in the new version of MS word.	K2	I
CO2	Examine basic and advanced text, paragraph and document formatting.	K4	II
CO3	Construct brochures, flyers, and even business cards using MS Word.	K3	III
CO4	Design new presentations from scratch or by using beautiful templates.	K6	III
CO5	Differentiate various special effects and add it to slide transitions to spice up your presentations.	K4	IV
CO6	Build slide shows and rehearse timings for your slides.	K6	V

**Core - IV: DATABASE CONCEPTS**

**SEMESTER: IV**  
**CREDITS:4**

**CODE: U21CA404**  
**HOURS/WEEK: 4**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Explain database concepts, structures, query language components and roles of DBMS.	K2	I
CO2	Recognize and utilize contemporary logical design methods and tools for databases	K3	II
CO3	Build SQL queries for the specified problem statement.	K6	III
CO4	Construct ER diagrams for specified problems.	K3	III
CO5	Categorize basic issues of transaction processing and concurrency control.	K4	IV
CO6	Compose pertinent queries to haul out information from large datasets.	K6	V





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**Core Practical - IV: DATABASE CONCEPTS LAB**

**SEMESTER: IV**  
**CREDITS:2**

**CODE: U21CA4P4**  
**HOURS/WEEK: 3**

**At the end of this course, the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Exercise</b>
CO1	Explain the underlying concepts of database technologies.	K2	1,2
CO2	Implement nested queries.	K6	3
CO3	Construct built-in functions	K6	4
CO4	Populate and query a database using SQL DML/DDDL commands.	K6	1-5
CO5	Programming PL/SQL including stored procedures, stored functions, cursors, packages	K6	6-10
CO6	Declare integrity constraints on a database using RDBMS	K6	8

**Allied -V: MICROPROCESSOR & COMPUTER ARCHITECTURE AND ORGANIZATION**

**SEMESTER: IV**  
**CREDITS: 3**

**CODE: U21CA4Y5**  
**HOURS/WEEK: 5**

**After the successful completion of the course the students will be able to**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Explain the evolution of microprocessors and components of CPU.	K2	I
CO2	Illustrate Intel 8085 architecture and instruction set.	K2	II
CO3	Develop assembly language programs using Intel 8085 instructions.	K6	III
CO4	Apply the basic concepts of interfacing memory and peripheral devices in a microprocessor.	K3	III
CO5	Discuss the concepts of Input Output Organization	K6	IV
CO6	Elaborate various Memory Organization.	K6	V



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**Allied VI: INTRODUCTION TO INTERNET OF THINGS**

**SEMESTER: IV**  
**CREDITS: 3**

**CODE: U21CA4Y6**  
**HOURS/WEEK: 3**

**After the successful completion of the course the students will be able to:**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Recall and compare Internet of computer with Internet of Things.	K1	1
CO2	Identify the application of wireless technologies in various applications	K1	2
CO3	Analyze different protocols in various IoT Layer	K4	3
CO4	Differentiate IoT from Machine-to-Machine communication	K4	3
CO5	Design and demonstrate IoT Applications using Python in Raspberry Pi	K6	5
CO6	Identify different simulators used in various applications of IoT	K1	5

**NMEC - II: MS-OFFICE EXCEL**

**SEMESTER: IV**  
**CREDITS:2**

**CODE: U21CA4E2**  
**HOURS/WEEK: 2**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Explain the various basic working steps in the workbook.	K2	I
CO2	Know and explain the tools in Microsoft Excel.	K3	II
CO3	Working with cut, copy, paste options in cells.	K3	III
CO4	Working with cell formatting options.	K3	III
CO5	Writing formulas and inserting functions in Excel.	K3	IV
CO6	Creating and editing tables in Excel.	K6	V



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**Core - V: PROGRAMMING IN ASP.NET WITH C#**

**SEMESTER: 5**

**CREDITS:5**

**CODE: U21CA505**

**HOURS/WEEK: 6**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Discuss the fundamental concepts of .NET Framework.	K6	I
CO2	Develop C# program using object-oriented programming such as class, method and object.	K6	II
CO3	Discuss the common concepts used with web controls.	K6	III
CO4	Outline the methods to preserve state of a control, web page, object and user in the application using state management concept.	K2	III
CO5	Demonstrate disconnected data access technologies in ADO.NET objects for data manipulations.	K2	IV
CO6	Develop a web page to manipulate data using Gridview.	K6	V

**Core - I: OPERATING SYSTEM**

**SEMESTER: V**

**CREDITS:5**

**CODE: U21CA506**

**HOURS/WEEK: 6**

**At the end of the course, the student will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Determine the fundamental components of a computer operating system.	K5	I
CO2	Explain the various memory management techniques.	K2	II
CO3	Define the state model.	K1	III
CO4	Classify the policies for scheduling.	K2	III
CO5	Describe deadlocks, synchronization, system calls, and file systems.	K3	IV
CO6	Illustrate the behaviour of OS by writing Shell scripts.	K2	V



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**Core – VII: FUNDAMENTALS OF DATA STRUCTURES AND ALGORITHMS**

**SEMESTER: V**  
**CREDITS: 5**

**CODE: U21CA507**  
**HOURS/WEEK: 5**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Recall the basic data structures such as arrays, linked lists, stacks and queues.	K1	I
CO2	Apply the concept of Dynamic memory management, data types, algorithms	K3	II
CO3	Illustrate Divide and conquer techniques.	K2	III
CO4	Make use of greedy method to solve job sequencing with deadlock problems.	K3	III
CO5	Importance of Problem solving techniques using dynamic programming techniques.	K5	IV
CO6	Develop backtracking algorithms for solving problems like knapsack, 8 queen's problem.	K6	V

**Core Practical- V: PROGRAMMING IN ASP.NET WITH C# LAB**  
**SEMESTER:V**  
**CREDITS:3**

**CODE: U21CA5P5**  
**HOURS/WEEK: 4**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Exercise</b>
CO1	Develop a windows application using form controls.	K6	1,2
CO2	Demonstrate the server controls using web form	K2	3,4
CO3	Illustrate sessions and cookies on a web page.	K2	5
CO4	Develop a web page implementing all validation controls.	K6	7
CO5	Examine the properties of Multi view control.	K4	8,10
CO6	Design a webpage to manipulate data stored in a database.	K6	9,10



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**Elective I-A: SOFTWARE ENGINEERING AND TESTING**

**SEMESTER: V**

**CREDITS: 5**

**CODE: U21CA5:1**

**HOURS/WEEK: 5**

**After the successful completion of the course the students will be able to:**

<b>CO. No</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Discuss the plan and solution for the software engineering problem by the use of different factors and development processes.	K6	I
CO2	Estimate the cost through the variety of factors and techniques.	K5	II
CO3	Design the software with the assistance of guidelines and requirement specification.	K6	III
CO4	Well-versed with fundamental concepts in software testing	K1	VI
CO5	Classify white box testing and black box testing	K2	V
CO6	Illustrate Performance testing and Regression testing	K2	VI

**Elective – I B: MULTIMEDIA SYSTEMS DESIGN**

**SEMESTER: V**

**CREDITS: 5**

**CODE: U21CA5:2**

**HOURS/WEEK: 6**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Explain the technical aspects of multimedia systems.	K2	I
CO2	Make use of Multimedia tools for editing text, painting drawing, creating animations and videos.	K3	II
CO3	Elaborate on various file formats for audio, video, text and media.	K6	III
CO4	Apply multimedia techniques to create website on the internet.	K3	IV
CO5	Illustrate the method of assembling and delivering a multimedia project.	K2	V
CO6	Develop multimedia applications that produce optimum performance.	K6	V



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**Elective – I C: ORGANIZATIONAL BEHAVIOUR**  
**SEMESTER: V** **CODE: U21CA5:3**  
**CREDITS:4** **HOURS/WEEK: 6**

**After the successful completion of the course the students will be able to**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Interpret the interpersonal skills in an organization to improve the organization's effectiveness.	K2	I
CO2	Compare the ethical behaviour with regard to perception and personality.	K2	II
CO3	Evaluate the emotional intelligence and the motivation phases by constant practices and strategies.	K5	III
CO4	Experiment with group development activities in decision making support.	K3	IV
CO5	Identify the levels of communication to make the network between the management and personnel in a better way.	K3	V
CO6	Elaborate the leadership standard to face the real time challenges.	K6	V

**SBEC – II: SOFT SKILLS (ORAL AND WRITTEN COMMUNICATION)**  
**SEMESTER: V** **CODE: U21CAPS2**  
**CREDITS: 2** **HOURS/WEEK: 2**

**At the end of this course, the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Familiarize the basic communication process	K1	I
CO2	Adapt the listening skills	K6	I
CO3	Apply the communication skills for general meetings	K3	II
CO4	Adapt to changing communication methods	K6	II
CO5	Update with the new communication strategies	K4	II
CO6	Build association with others for effective communication	K3	II





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**Core – VIII: PROGRAMMING IN PHP**

**SEMESTER: VI**  
**CREDITS: 5**

**CODE: U18CA608**  
**HOURS/WEEK : 5**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Make use of variables, constants, data types and flow controls in PHP.	K3	I
CO2	Develop PHP programs using objects, arrays, strings and other functions	K6	II
CO3	Create GUI based applications using forms.	K6	III
CO4	Construct and use database and tables using various MySQL queries.	K6	IV
CO5	Develop code using JavaScript.	K6	V
CO6	Summarize error handling and input validation methods.	K2	V

**Elective – II A: COMPUTER NETWORKS**

**SEMESTER : VI**  
**CREDITS:5**

**CODE: U21CA6:1**  
**HOURS/WEEK: 6**

**After the successful completion of the course, the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Independently understand basic computer network technology.	K1	I
CO2	Create a new protocol and test its efficiency.	K3	II
CO3	Apply different encoding and decoding mechanisms involved in different types of transmission media.	K5	III
CO4	Enumerate the layers of the OSI model and TCP/IP.	K2	IV
CO5	Identify the different types of network devices and their functions within a network	K3	V
CO6	To build the skills of routing mechanisms.	K6	VI



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**Elective – II B: DATA WAREHOUSING AND DATA MINING**

**SEMESTER: VI**  
**CREDITS: 5**

**CODE: U21CA6: 2**  
**TOTAL HOURS: 6**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Illustrate the fundamental concepts, benefits and problem areas associated with data mining.	K2	I
CO2	Explain different steps involved in the process of data preprocessing.	K2	II
CO3	Summarize various models of data warehousing and online analytical processing.	K2	III
CO4	Importance of frequent item set mining algorithms.	K5	IV
CO5	classify algorithm to predict accurately the target class of objects.	K5	IV
CO6	Elaborate working pattern of cluster analysis algorithm.	K6	V

**Elective – II C: E-COMMERCE – Framework, Technologies and Applications**

**SEMESTER : VI**  
**CREDITS : 5**

**CODE: U21CA6:3**  
**HOURS/WEEK: 6**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Elaborate the Scope of E-Commerce market	K6	I
CO2	Make use of various business models, payment schemes, security issues, online advertisements and marketing strategies.	K3	II
CO3	Construct overall framework of E-Commerce and role of internet in modern business.	K3	III
CO4	Develop the physical structure, communications and security threats in networks	K6	III
CO5	Categorize the organizational, managerial and technical foundation of information systems	K4	IV
CO6	Discuss knowledge about electronic payment methods in e-Banking and Electronic Data Interchange (EDI).	K6	V



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**Core Prac.VI: PHP PROGRAMMING LAB**

**SEMESTER: VI**  
**CREDITS: 4**

**CODE: U21CA6P6**  
**HOURS/WEEK:5**

**After the successful completion of the course the students will be able to:**

CO No.	Course Outcomes	Level	Exercise
CO1	Choose the appropriate loop and control statement to solve the problems.	K1	1-4
CO2	Make use of different string operations in programs.	K3	5
CO3	Describe various steps in web form validation.	K2	7,10
CO4	Experiment with various SQL queries, implement database connection and develop program using AJAX and PDO.	K3	11,12
CO5	Develop code to manage session and cookies.	K6	8,9
CO6	Create PHP programs to manage files and implement message passing mechanism.	K6	6

**Elective – III A: FUNDAMENTALS OF MACHINE LEARNING**

**SEMESTER: VI**  
**CREDITS: 5**

**CODE: U21CA6:4**  
**HOURS/WEEK: 6**

**After the successful completion of the course the students will be able to:**

CO No.	Course Outcomes	Level	Unit
CO1	Understand the fundamental concepts of machine learning and its types	K2	1
CO2	Analyze the various supervised learning techniques	K3	2
CO3	To know various unsupervised learning methods	K1	3
CO4	Perform study of probabilistic and ensemble methods	K4	4
CO5	Analyze Markov models and graphical techniques	K3	5
CO6	Apply various learning methods to appropriate problems	K3	5



**BISHOP HEBER COLLEGE (AUTONOMOUS)**  
**TIRUCHIRAPPALLI – 620017**  
**TAMILNADU, INDIA**

**Elective – III B: BIG DATA ANALYTICS**

**SEMESTER: VI**  
**COURSE CREDITS: 5**

**CODE: U21CA6:2**  
**HOURS/WEEK: 6**

**At the end of this course, the students will be able to:**

CO No.	Course Outcomes	Level	Unit
CO1	Explain the various basic concepts related to data analytics and related technologies.	K2	I
CO2	Explain the fundamental data analytics concepts.	K2	I
CO3	Know the usage of big data patterns and trends.	K2	II
CO4	Explain the various Big data technologies and Databases.	K2	III
CO5	Differentiate the RDBMS and Hadoop key features.	K4	IV
CO6	Prepare a plan to modify the design of Hadoop architecture.	K6	V

**Elective III C: CLOUD COMPUTING**

**SEMESTER : IV**  
**CREDITS:5**

**CODE: U21CA6:6**  
**HOURS/WEEK: 6**

**At the end of this course, the students will be able to:**

CO No.	Course Outcomes	Level	Unit
CO1	Explain the various basic concepts related to cloud computing technologies	K2	I
CO2	Know and explain the infrastructure-oriented mechanisms.	K3	II
CO3	Explain the fundamental cloud architectures	K2	III
CO4	Explain the architecture and concept of different cloud models: IaaS, PaaS, SaaS	K2	III
CO5	Discover major security and privacy problems in the cloud and how they are addressed with the security mechanisms.	K4	IV
CO6	Formulate a plan to modify and design cloud computing architecture	K6	V



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**SBEC -III : PROGRAMMING IN ANDROID**

**SEMESTER : VI**

**CODE: U21CA6S3**

**CREDITS: 2**

**HOURS/WEEK: 2**

**After the successful completion of the course the students will be able to:**

<b>CO No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit</b>
CO1	Design useful apps with android.	K4	I
CO2	Demonstrate the installation of android development environment.	K3	1
CO3	Construct SQLite databases and perform various operations on it.	K6	III
CO4	Develop APIs with location-based services, understand the android GUI architecture.	K6	IV
CO5	Illustrate 2D and 3D Graphics concepts in android.	K2	V
CO6	Construct animations with OpenGL Graphics.	K6	V



# BISHOP HEBER COLLEGE (AUTONOMOUS)

## TIRUCHIRAPPALLI – 620017

### TAMILNADU, INDIA

MCA Computer Applications			
PROGRAM NAME	COURSE	COURSE CODE	COURSE NAME
MCA Computer Applications	Core I	P20CA101	Programming in .NET Technology
MCA Computer Applications	Core II	P20CA102	Operating Systems
MCA Computer Applications	Core III	P20CA103	Resource Management Techniques
MCA Computer Applications	Core IV	P20CA104	Accounting and Financial Management
MCA Computer Applications	Elective I	P20CA1:1/	Software Engineering/
MCA Computer Applications	Elective I	P20CA1:2/	Digital Computer Fundamentals and Architecture/
MCA Computer Applications	Elective I	P20CA1:3	Computer Graphics
MCA Computer Applications	Core Practical I	P20CA1P1	Programming in .NET Technology Lab
MCA Computer Applications	Core Practical II	P20CA1P2	Operating System Programming Lab
MCA Computer Applications	SBC	P20CAPS1	Communication and Life Skills
MCA Computer Applications	Bridge Course I	P20CA1N1	Object Oriented Programming
MCA Computer Applications	Bridge Course II	P20CA1N2	Information Technology
MCA Computer Applications	Bridge Course III	P20CAPN3	Object Oriented Programming Lab
MCA Computer Applications	Core V	P20CA205	Programming in Java
MCA Computer Applications	Core VI	P20CA206	Database Management Systems
MCA Computer Applications	Core VII	P20CA207	Data Structures and Algorithms
MCA Computer Applications	Elective II	P20CA2:1	Soft Computing
MCA Computer Applications	Elective II	P20CA2:2	Data Warehousing and Data Mining
MCA Computer Applications	Elective II	P20CA2:3	Artificial Intelligence





# BISHOP HEBER COLLEGE (AUTONOMOUS)

## TIRUCHIRAPPALLI – 620017

### TAMILNADU, INDIA

MCA Computer Applications	Elective III	P20CA2:4	Customer Relationship Management
MCA Computer Applications	Elective III	P20CA2:5	Enterprise Resource Planning
MCA Computer Applications	Elective III	P20CA2:6	Management Information Systems
MCA Computer Applications	Core Practical III	P20CA2P3	Programming in Java Lab
MCA Computer Applications	Core Practical IV	P20CA2P4	Database Management Systems Lab
MCA Computer Applications	Core Project I	P20CA2PJ	Summer Project
MCA Computer Applications	Bridge Course IV	P20CA2N4	Internet Programming
MCA Computer Applications	Bridge Course V	P20CA2N5	Linux Programming
MCA Computer Applications	Bridge Course VI	P20CAPN6	Internet Programming Lab
MCA Computer Applications	Core VIII	P20CA308	Smart Devices Programming
MCA Computer Applications	Core IX	P20CA309	Programming in Python
MCA Computer Applications	Core X	P20CA310	Computer Network and Network Security
Elective IV	Elective IV	P20CA3:1	Organizational Behavior
MCA Computer Applications	Elective IV	P20CA3:2	Business Intelligence
MCA Computer Applications	Elective IV	P20CA3:3	Human Resource Management
MCA Computer Applications	Elective V	P20CA3:4	Big Data Analytics
MCA Computer Applications	Elective V	P20CA3:5	Block Chain and Crypto-Currencies
MCA Computer Applications	Elective V	P20CA3:6	Cloud Computing
MCA Computer Applications	Core Practical V	P20CA3P5	Smart Devices Programming Lab



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MCA Computer Applications	Core Practical VI	P20CA3P6	Programming in Python Lab
MCA Computer Applications		P20CA3S2	Numerical Aptitude
MCA Computer Applications	Core XI	P20CA411	Machine Learning for Data Science
MCA Computer Applications	Core XII	P20CA412	Internet of Things
MCA Computer Applications	Core Practical VII	P20CA4P7	Data Science Lab
MCA Computer Applications	Core Project II	P20CA4PJ	Project - II



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**Core I : PROGRAMMING IN .NET TECHNOLOGY**

**SEMESTER : I**  
**CREDITS:3**

**CODE:P20CA101**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Create web applications using HTML controls and server controls	K6	I
CO2	Design web applications using MVC pattern and demonstrate CRUD application	K6	II
CO3	Combine Models with Views using model binding	K6	III
CO4	Design a web application with improved Ajax controls	K6	IV
CO5	Construct Web API and avail the existing Web API's whenever needed. (K6)	K6	V
CO6	Develop an API for CRUD operations	K6	V

**Core II: OPERATING SYSTEMS**

**SEMESTER : I**  
**CREDITS:3**

**CODE: P20CA102**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Summarize the basic concepts and functionalities of operating systems	K2	I
CO2	Determine the situations that lead to deadlock and starvation by recognizing the state of the process	K5	II
CO3	Analyze and apply effective memory management techniques	K4	III
CO4	Compare the various scheduling algorithms for uniprocessors and multiprocessors	K5	IV
CO5	Make use of the various I/O management and disk scheduling techniques	K3	V
CO6	Discuss secondary storage and file management techniques	K6	V



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**Core III : RESOURCE MANAGEMENT TECHNIQUES**  
**SEMESTER : I**  
**CREDITS:3**

**CODE: P20CA103**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Explain linear programming problems	K2	I
CO2	Solve the Transportation problem and assignment problem	K3	II
CO3	Construct Queuing models for real life problems	K3	III
CO4	Analyze the various queuing models	K4	III
CO5	Analyze the various Inventory models and solve Inventory control problems	K4	IV
CO6	Develop network scheduling by PERT and CPM	K6	V

**Core IV: ACCOUNTING AND FINANCIAL MANAGEMENT**  
**SEMESTER: I**  
**CREDITS: 3**

**CODE: P20CA104**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No	Course Outcomes	Level	Unit Covered
CO1	Examine the basic concepts of accounting and its principles	K4	I
CO2	Construct the financial statements with suitable standards	K5	I
CO3	Identify the major elements of long-term and short-term ratio analysis	K3	II
CO4	Estimate cost per Unit Covered on various technique	K5	III
CO5	Distinguish shares and debentures of a company	K4	IV
CO6	Predict the marketing strategies to understand the consumer behavior and buying motives	K6	V



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**Elective I: Digital Computer Fundamentals and Architecture**  
**SEMESTER : I**  
**CREDITS: 3**  
**CODE: P21CA1:2**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Outline Architecture of Different Microprocessor	K2	I
CO2	Apply Addressing modes in Program	K3	I
CO3	Develop Assembly Language Program 8086	K6	II
CO4	Outline Architecture of Pentium Microprocessor	K2	III
CO5	Adapt Peripherals Interface in Real time application	K6	IV
CO6	Develop program using 8051 instructions	K6	V

**Elective I: SOFTWARE ENGINEERING**  
**SEMESTER : I**  
**CREDITS:3**  
**CODE: P20CA1:1**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Summarize the basic concepts and the functionalities of Software Engineering	K2	I
CO2	Identify the various software requirements in designing processes	K3	II
CO3	Examine the quality of the software	K4	III
CO4	Apply the various software management techniques to maintain the software	K3	IV
CO5	Assess the software using metric techniques	K5	V
CO6	Develop software and apply strategies of project management	K6	V



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**Elective I: COMPUTER GRAPHICS**

**SEMESTER : II**  
**CREDITS : 3**

**CODE: P20CA1:3**  
**HOURS/WEEK: 4**

**After the completion of this course the students will be able to:**

<b>S.N o.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Unit Covered</b>
CO 1	Summarize the basic concepts and features and mathematical applications of Computer Graphics	K2	I
CO 2	Analyze the fundamentals of 2D and 3D Computer Graphics	K3	II
CO 3	Apply the various concepts of viewing and interactive techniques	K4	III
CO 4	Examine the three-dimensional techniques in Computer Graphics Application	K3	IV
CO 5	Build the knowledge of Visible–Surface Detection Methods	K5	V
CO 6	Develop the application using computer animation	K6	V

**Core Practical I :PROGRAMMING IN .NET TECHNOLOGY LAB**

**SEMESTER : I**  
**CREDITS:3**

**CODE: P20CA1P1**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

<b>S.No.</b>	<b>Course Outcomes</b>	<b>Level</b>	<b>Exercise</b>
CO1	Design web applications using ASP.NET controls	K6	1
CO2	Create application using MVC Bootstrap	K6	2,3
CO3	Develop ASP .NET MVC Dashboard applications	K6	4
CO4	Create application using model class in ASP .NET MVC framework	K6	5,6
CO5	Design web applications with database connectivity	K6	7
CO6	Justify Code First methodology	K5	8





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**Core Practical II: OPERATING SYSTEM PROGRAMMING LAB**  
**SEMESTER : I**  
**CREDITS:3**

**CODE: P20CA1P2**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Exercise
CO1	Compare the various CPU scheduling algorithms	K5	1
CO2	Compare the file allocation strategies	K5	2,6
CO3	Implement various memory management techniques	K6	3,4,5
CO4	Determine the situations that lead to deadlock	K3	7
CO5	Make use of disk scheduling algorithms	K5	8
CO6	Make use of page replacement algorithms	K5	9,10

**SBC: COMMUNICATION AND LIFE SKILL**  
**SEMESTER : I**  
**CREDIT:1**

**CODE: P21CAPS1**  
**HOURS/WEEK: 2**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Summarize the importance of Listening, Speaking, Reading and Writing	K2	I
CO2	Construct effective reports and contents for writing	K6	II
CO3	Build leadership and problem-solving skills	K6	III
CO4	Develop good interaction skills	K6	IV
CO5	Compose a good resume and cover letters	K6	V
CO6	Improve their presentation skills for facing interviews	K6	V



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**BRIDGE COURSE I: OBJECT ORIENTED PROGRAMMING**

**SEMESTER : I**

**CREDITS:4**

**CODE: PB20CA11**

**HOURS/WEEK: ...**

**After the completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Recall about evolution and features of C++ and OOPs basics	K1	I
CO2	Construct applications using the concept of Function Overloading	K6	II
CO3	Developing C++ programs using Class and Objects	K6	III
CO4	Apply Friend Function in real time applications	K6	III
CO5	Develop Programs using Operator Overloading	K6	IV
CO6	Develop programs using Virtual functions	K6	V

**BRIDGE COURSE – II INFORMATION TECHNOLOGY**

**SEMESTER : I**

**CREDITS: 4**

**CODE: PB20CA12**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit
CO1	Explain the applications of information technology	K5	I
CO2	Distinguish system software and application software	K4	II
CO3	Classify the network topologies	K4	III
CO4	Explain LAN,WAN,MAN	K2	III
CO5	Explain IP Addressing	K2	IV
CO6	Classify the operating system	K4	V



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**2.6.1 Programme Outcomes and Course Outcomes for all Programmes Offered by the Institution are Stated and Displayed on Website and Communicated to Teachers and Students**

**BRIDGE COURSE III:OBJECT ORIENTED PROGRAMMING LAB**

**SEMESTER : I**  
**CREDITS:2**

**CODE: PB20CA1P**  
**HOURS/WEEK:...**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Exercise
CO1	Demonstrate the concept of class and Object	K2	1,2,3,5
CO2	Demonstrate Function Overloading	K6	4
CO3	Develop a C++ program using Constructor and Destructor	K6	7
CO4	Make use of Operator overloading	K2	8
CO5	Apply Inheritance in C++ programming	K3	9
CO6	Develop a C++ program using virtual functions	K6	10

**Core V : PROGRAMMING IN JAVA**

**SEMESTER : II**  
**CREDITS:3**

**CODE: P20CA205**  
**HOURS/WEEK: 4**

**After the completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Summarize Object Oriented Programming concepts	K1	I
CO2	Create programs using inheritance, interfaces and multithreading	K6	II
CO3	Construct Java applications using I/O Streams	K6	III
CO4	Build interactive applications using AWT and swing components	K6	III
CO5	Design applications to remotely invoke services using RMI	K6	IV
CO6	Plan the flow of web pages to develop web applications using servlets	K6	V



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**Core VI: DATABASE MANAGEMENT SYSTEMS**

**SEMESTER: II**

**CREDITS:4**

**CODE: P20CA206**

**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Analyze the concepts in database management systems	K4	I
CO2	Design ER model to represent database application scenarios	K6	II
CO3	Improve the database design by normalization	K6	II
CO4	<i>Examine</i> the use of indexing and hashing technique used in database design	K4	III
CO5	Explain the concepts of transaction management.	K5	IV
CO6	Create a database using SQL and PL/SQL	K6	V

**Core VII: DATA STRUCTURES AND ALGORITHMS**

**SEMESTER : II**

**CREDITS:4**

**CODE: P20CA207**

**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Summarize the basic concepts of data structures	K2	I
CO2	Distinguish the applications of various binary tree	K4	II
CO3	Decide the applications that can make use of graph structures	K5	III
CO4	Test various algorithms for sorting	K6	IV
CO5	Solve shortest path problems	K6	V
CO6	Construct applications by applying graph coloring	K6	V



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**Elective II : SOFT COMPUTING**

**SEMESTER: II**  
**CREDITS:3**

**CODE: P20CA2:1**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Summarize the Soft Computing techniques, their development and features	K2	I
CO2	Analyze the basic concept of Artificial Neural Network and its models	K4	II
CO3	Explain the importance of various supervised learning techniques	K5	III
CO4	Discuss the various types of defuzzification methods.	K6	IV
CO5	Formulate the formation of Fuzzy rules and reasoning based on Fuzzy rules	K5	IV
CO6	Make use of the knowledge in Genetic algorithms to solve optimization problem	K3	V

**ELECTIVE II: DATAWAREHOUSING AND DATA MINING**

**SEMESTER : II**  
**CREDITS:3**

**CODE: P20CA2:2**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Summarize the basic concepts in data mining and the techniques in knowledge mining	K2	I
CO2	Analyze the fundamentals of Data Preprocessing	K4	II
CO3	Apply the various concepts of Data Warehousing and Online Analytical Processing for forecasting	K3	II
CO4	Elaborate the techniques in classification	K6	III
CO5	Analyze the cluster algorithms	K4	IV
CO6	Estimate the knowledge of Outlier Detection, Data Mining Trends and Research Frontiers	K6	V



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**ELECTIVE II: ARTIFICIAL INTELLIGENCE**

**SEMESTER: II**  
**CREDITS: 3**

**CODE: P20CA2:3**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Apply the fundamentals of Artificial Intelligence (AI) and its foundations for solving AI problems	K3	I
CO2	Solve real life problems using AI techniques like searching and game playing in a state space representation	K6	II
CO3	Propose solutions using knowledge representation, logic and heuristic search for AI problems	K6	III
CO4	Compare the different types of intelligent agents, Expert Systems, Artificial Neural Networks and other Machine Learning Models	K5	IV
CO5	Develop applications using Artificial Intelligence techniques and Data Mining Tools	K6	IV
CO6	Discuss the concepts of Expert Systems and Machine Learning	K6	V

**Elective III - CUSTOMER RELATIONSHIP MANAGEMENT**

**SEMESTER : II**  
**CREDITS:3**

**CODE: P20CA2:4**  
**HOURS/WEEK:4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Evaluate customer lifetime values	K5	I
CO2	Plan ways for retaining a customer	K6	II
CO3	Summarize customer lifecycle and customer values	K2	II
CO4	Compare value in use and value in exchange	K4	III
CO5	Develop customer related database for knowledge management	K6	IV
CO6	Analyze structured and unstructured data	K4	V





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**Elective III: ENTERPRISE RESOURCE PLANNING**

**SEMESTER : II**  
**CREDITS: 3**

**CODE: P20CA2:5**  
**HOURS/WEEK:4**

**After the successful completion of this course, the students will be able to:**

S. No.	Course Outcomes	Level	Unit Covered
CO1	Summarize the basic concepts of ERP systems	K2	I
CO2	Distinguish between MRP, MRP II and ERP systems	K4	II
CO3	Analyze the technologies related to ERP systems and major components	K4	III
CO4	Discover the knowledge of typical ERP systems	K4	III
CO5	Assess the advantages and limitations of implementing ERP systems	K5	IV
CO6	Relate the various processes in business using ERP concepts and techniques	K2	V

**Elective III: MANAGEMENT INFORMATION SYSTEMS**

**SEMESTER : II**  
**CREDITS : 3**

**CODE : P20CA2:6**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Recall the role of information technology and information system in business	K1	I
CO2	Evaluate the role of information systems in supporting various levels of business strategy	K2	II
CO3	Analyze and synthesize business information and systems to facilitate evaluation of strategic alternatives	K3	III
CO4	Describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems	K3	IV
CO5	Build a business case for IT, addressing key IT acquisition decisions such as make/buy; outsource/in source; project management	K5	V
CO6	Create the theoretical models used in database management systems to answer business questions	K6	V



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**Core Practical III: PROGRAMMING IN JAVA LAB**

**SEMESTER : II**  
**CREDITS:3**

**CODE: P20CA2P3**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Exercise
CO1	Demonstrate the concept of package, interface	K2	1,2,3,4
CO2	Demonstrate exception handling mechanism	K6	5
CO3	Develop a java program to handle multithreads	K3	6
CO4	Make use of collections and IO streams	K2	7,8
CO5	Apply event handling on AWT and Swing components	K3	9,10
CO6	Develop a Java program to manipulate database, using Java Data Base Connectivity (JDBC)	K6	11

**Core Practical IV : DATABASE MANAGEMENT SYSTEMS LAB**

**SEMESTER : II**  
**CREDITS: 3**

**CODE: P20CA2P4**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Exercise
CO1	Create tables and insert values	K6	1,2
CO2	Construct queries for table manipulation	K6	3,4
CO3	Compile sub queries for retrieving data from tables	K6	5
CO4	Develop queries using aggregate, string and date functions	K6	6
CO5	Create views on tables	K6	7
CO6	Develop PL/SQL programs using triggers, functions, cursors and exception	K6	8,9,10,11,12, 13



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**BRIDGE COURSE – IV: INTERNET PROGRAMMING**

**SEMESTER: II**  
**CREDITS: 4**

**CODE: PB20CA24**

**After the completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Define the basics of HTML5 tags with semantic elements	K1	I
CO2	Outline the web applications using tables and multimedia	K2	II
CO3	Build an appropriate primitives and operations in JavaScript	K3	III
CO4	Distinguish the web pages to interact by using JavaScript and DOM concepts	K4	IV
CO5	Adapt events and event handlers for Dynamic web application	K6	V
CO6	Design a web application with secure and user-friendly with angular web framework	K6	V

**BRIDGE COURSE V : LINUX PROGRAMMING**  
**SEMESTER : II**  
**CREDITS:4**

**CODE: PB20CA25**

**After the completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit covered
CO1	Create and work with Linux Shell programming techniques and files	K6	I
CO2	Assess the information in the files and terminals	K5	II
CO3	Apply various data management techniques, tools with other debugging functions.	K3	III
CO4	Design and apply various functionalities of process and signals	K6	IV
CO5	Develop GNOME programming using GTK+.	K6	V
CO6	Construct programming with KDE using Qt	K6	V



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**TIRUCHIRAPPALLI – 620017**  
**TAMILNADU, INDIA**

**BRIDGE COURSE – VI: INTERNET PROGRAMMING LAB**

**SEMESTER: II**  
**CREDITS: 2**

**CODE: PB20CA2P**

**After the completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Exercise Covered
CO1	Summarize the basic tags to develop web pages design using Html	K2	1,3,4
CO2	Construct the web page using image mapping and link the pages using hyperlinks	K6	2
CO3	Create the tabular content in web page using tables, form and canvas	K6	5,6,8,13
CO4	Develop a web page with multimedia and display the new articles using semantic elements	K6	7,9
CO5	Design a web page for various event and event handlers	K6	10,11,12
CO6	Design a web site to interact with users AngularJS	K6	14,15

**Core VIII :SMART DEVICES PROGRAMMING**

**SEMESTER : III**  
**CREDITS: 3**

**CODE: P20CA308**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Explain various mobile application developing environments and IDEs	K5	I
CO2	Create mobile applications using intents, activities and components	K6	II
CO3	Choose the appropriate layouts and UI controls based on the specification	K6	III
CO4	Construct SQLite database to build Android application	K6	IV
CO5	Utilize the memory management mechanisms efficiently	K6	V
CO6	Test the applications in web and launch the services	K6	V



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**Core IX: PROGRAMMING IN PYTHON**

**SEMESTER : III**  
**CREDITS: 3**

**CODE: P20CA309**  
**HOURS/WEEK: 5**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Illustrate the basics of python to develop python programs with conditional controls and loops	K2	I
CO2	Experiment with python data structures –lists, tuples and dictionaries for programming	K3	II
CO3	Examine python functions and call them	K4	III
CO4	Construct programs using classes and objects	K6	III
CO5	Adapt files, modules and packages and perform database operations on them	K6	IV
CO6	Construct programs using GUI and django framework	K6	V

**Core X: COMPUTER NETWORKS AND NETWORK SECURITY**

**SEMESTER : III**  
**CREDITS : 4**

**CODE: P20CA310**  
**HOURS/WEEK: 5**

**After the completion of this course, the students will be able to:**

S.No	Course Out Comes	Level	Unit Covered
CO1	Compare OSI and TCP/IP Reference Models	K4	I
CO2	Apply the framing methods and data-link layer issues of error detection, corrections and flow control	K3	II
CO3	Choose the routing algorithms for congestion control	K5	III
CO4	Analyze the functions of TCP and UDP protocols.	K4	IV
CO5	Evaluate the features and operations of application layer protocols	K5	IV
CO6	Test the cryptography and network security algorithms	K6	V





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**Elective IV: ORGANIZATIONAL BEHAVIOUR**

**SEMESTER: III**  
**CREDITS: 3**

**CODE: P20CA3:1**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Practice the use of scientific foundations of Organizational Behavior and analyze the Individual Behavior	K3	I
CO2	Analyze the personality, perception and attitudes of an in an organization and to examine the levels of job satisfaction	K4	II
CO3	Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization	K3	III
CO4	Evaluate the conflict management strategies used in organization and to analyze the job frustration and job stress	K5	IV
CO5	Evaluate the appropriateness of various leadership styles	K5	V
CO6	Explain how organizational change and culture affect working relationships within organizations	K6	V

**Elective IV: BUSINESS INTELLIGENCE**

**SEMESTER : III**  
**CREDITS:3**

**CODE: P20CA3:2**  
**WEEK/HOURS: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Identify the major frameworks of computerized decision support systems	K2	I
CO2	Categorize complex business problems in terms of analytical models	K4	II
CO3	Demonstrate ethical decision-making in structured or unstructured Problems	K2	III
CO4	Compare the impact of business reporting, information visualization, and dashboards	K2	IV
CO5	Adapt data mining tools, neural networks, web mining, web analytics in BI	K6	V
CO6	Elaborate how analytics are powering consumer applications and creating a new opportunity Covered for entrepreneurship for analytics	K6	V





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**Elective IV: HUMAN RESOURCE MANAGEMENT**

**SEMESTER : III**  
**CREDITS : 3**

**CODE: P20CA3:3**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Outline the basic concepts, functions and processes of human resource management	K2	I
CO2	Analysis Job techniques and methods	K4	II
CO3	Build and communicate the human resources component of the organization's business plan	K3	III
CO4	Develop employability skills	K6	III
CO5	Agree to manage and plan key human resource functions within organizations	K5	IV
CO6	Determine to handle employee issues and evaluate the new trends in HRM	K5	V

**Elective V: BIG DATA ANALYTICS**

**SEMESTER : III**  
**CREDITS:3**

**CODE: P21CA3:4**  
**HOURS/WEEK: 4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Importance of Big Data and Big Data Analytics	K5	I
CO2	Criticize the various Databases available in Big Data	K5	II
CO3	Elaborate the different technologies of big data	K6	III
CO4	Determine the concepts of cloud computing, cloud components, cloud architecture, services and models	K5	IV
CO5	Compare the various cloud storages and services	K5	V
CO6	Develop cloud applications	K6	V



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**Elective V: BLOCK CHAIN AND CRYPTO-CURRENCIES**  
**SEMESTER : III**  
**CREDITS:3**  
**CODE: P20CA3:5**  
**HOURS/WEEK: 4**

After the successful completion of this course, the students will be able to:

S.No.	Course Outcomes	Level	Unit Covered
CO1	Understand the benefits and limitations of Blockchain	K2	I
CO2	Make use of the <b>Cryptocurrency Bitcoin, Altcoin and Tokens</b>	K3	II
CO3	Examine Bitcoin features and its <b>Smart Contracts</b>	K4	III
CO4	Evaluate <b>Initial Coin Offering</b>	K5	IV
CO5	Propose security <b>algorithms for Blockchain</b>	K6	IV
CO6	Build applications using the features of Blockchain	K6	V

**Elective V: Cloud Computing**  
**SEMESTER : III**  
**CREDITS : 3**  
**CODE: P20CA3:6**  
**HOURS/WEEK: 4**

After the successful completion of this course the students will be able to:

S.No.	Course Outcomes	Level	Unit Covered
CO1	Analyze the efficiency of parallel computing system and evaluate the types of application for which parallel programming is useful	K4	I
CO2	Identify the development, analyze, and implement algorithms for parallel algorithms design	K3	II
CO3	Assess the different parallel architectures, inter-connect networks, programming models, and algorithms for common operations such as matrix-vector multiplication	K5	III
CO4	Evaluate issues of dense matrix multiplication and efficiency of solving system of linear equations	K5	III
CO5	Apply design and development principles in the construction of software systems of varying complexity	K3	IV
CO6	Choose knowledge of computing and mathematics appropriate to the graph algorithms	K5	V



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**Core Practical V: SMART DEVICES PROGRAMMING LAB**

**SEMESTER : III**  
**CREDITS:3**

**CODE: P20CA3P5**  
**HOURS/WEEK: 4**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Exercise
CO1	Develop mobile applications using various layouts	K6	1,2,3
CO2	Create simulators such as AVD or test with mobile phone to execute the application	K6	4,5,6
CO3	Develop mobile application that integrates SMS and Call services	K6	7
CO4	Develop a mobile application by integrating an application with SQLite	K6	9, 10, 11
CO5	Build mobile web applications	K6	12,13,14
CO6	Maximize the use of HTML5, CSS3 and JavaScript to develop mobile web applications	K6	15

**Core Practical VI : PROGRAMMING IN PYTHON LAB**  
**SEMESTER : III**  
**CREDITS:3**

**CODE: P20CA3P6**  
**HOURS/WEEK:4**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Exercise Covered
CO1	Design programs using control structures and loops	K6	1,2
CO2	Develop programs using functions, classes and objects	K6	6
CO3	Develop Programs using different data structures	K6	4,5
CO4	Demonstrate the Concept of Packages, modules and files and Exception Handling	K6	3,7,8
CO5	Construct applications with database operations	K6	9,10,11,12,13
CO6	Demonstrate web programs with Django framework	K6	14,15



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**BRIDGE COURSE VII: DIGITAL COMPUTER FUNDAMENTALS AND  
ARCHITECTURE**

**SEMESTER: III**  
**CREDITS: 4**

**CODE: PB20CA37**

**After the successful completion of this course the students will be able to:**

S.No.	Course Outcomes	Level	Unit
1	Apply Number Systems-to convert numbers from one form to another	K3	I
2	Recall all binary codes	K1	I
3	Develop k-map to design Boolean expression	K6	II
4	Create the basic building blocks	K6	III
5	Design RS flipflops, JK flipflops, D-flipflops, registers and n-modcounters	K6	IV
6	Determine the central processing unit	K5	V

**BRIDGE COURSE VIII: PHP AND MYSQL**

**SEMESTER :III**  
**CREDITS: 4**

**CODE: PB20CA38**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Unit covered
CO1	Develop a PHP program using variables and basic statements	K6	I
CO2	Utilize the different types of arrays	K3	I
CO3	Create custom functions using PHP built-in functions	K6	II
CO4	Distinguish POST and GET in form submission	K4	III
CO5	Create sessions and cookies	K6	IV
CO6	Design Dynamic web site using server-side PHP and MYSQL Database	K6	V



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**BRIDGE COURSE IX: PHP AND MYSQL LAB**

**SEMESTER : IV**  
**CREDITS:2**

**CODE: PB20CA3P**

**After the successful completion of this course, the students will be able to:**

S.No.	Course Outcomes	Level	Exercise covered
CO1	Develop PHP programs using Control structures	K6	1,2
CO2	Apply various functions on arrays, Math, String	K3	3,4
CO3	Design PHP programs using Class and Object	K2	5
CO4	Design PHP programs using Form Handling and Files	K6	6,7
CO5	Apply cookies, sessions in PHP program Sending Mail	K3	8,9,10
CO6	Develop web application PHP programming and Database using MySQL	K6	11,12,13

**Core XII: MACHINE LEARNING FOR DATA SCIENCE**

**SEMESTER: IV**  
**CREDITS:3**

**CODE: P20CA411**  
**HOURS/WEEK: 4**

**After the successful completion of this, course the students will be able to:**

S.No.	Course Outcomes	Level	Unit Covered
CO1	Understand the statistical terminologies for building a model	K2	I
CO2	Categorize and explore data using R	K4	II
CO3	Compare the various classification algorithms	K5	III
CO4	Identify the patterns and association in a dataset using association rules	K3	IV
CO5	Build models for forecasting	K6	V
CO6	Evaluate the performance of the developed model	K5	V



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**Core XII: INTERNET OF THINGS**

**SEMESTER: IV**  
**CREDITS:3**

**CODE: P20CA412**  
**HOURS/WEEK: 4**

After the successful completion of this course, the students will be able to:

S.No.	Course Outcomes	Level	Unit Covered
CO1	Discuss the physical and logical design of the Internet of Things (IoT)	K5	I
CO2	Elaborate on domain-specific IoT	K6	II
CO3	Explain IoT system management with NETCONF-YANG	K5	III
CO4	Analyze the various M2M and IoT system management	K4	III
CO5	Discuss the building blocks of IoT physical devices and endpoints	K6	IV
CO6	Develop IoT solutions using IoT data analytics	K6	V

**Core Practical VII: DATA SCIENCE LAB**

**SEMESTER : IV**  
**CREDITS:3**

**CODE: P20CA4P7**  
**HOURS/WEEK: 4**

After the successful completion of this, course the students will be able to:

S.No.	Course Outcomes	Level	Exercise
CO1	Apply various operations in vectors, lists, matrices and arrays	K5	1,2
CO2	Evaluate the dataset	K6	3
CO3	Choose the visualization technique	K5	4,5,6
CO4	Predict the patterns using association rules	K5	7,8,10
CO5	Build models using logistic regression	K6	9
CO6	Test the performance of the developed model	K6	11