CURRICULUM STRUCTURE-BCA

SEMESTER I

Code	Subject Name	Credits
----	LanguagePaper-I	3
100L1Z	EnglishPaper-I	3
120C1A	**CC-I**:PythonProgramming	5
120C11	**CC-II:**PythonProgrammingPractical	5
120E1A 120E1B 120E1C	**EC-IIGeneric/DisciplineSpecific** (Any one) Mathematics I StatisticsI FinancialAccountingI	3
120S1A 100L1L 100L1M	**SEC-I**: OfficeAutomation BasicTamil-I(OtherLanguageStudents) AdvancedTamil-I(OtherLanguageStudents)	2
120B1A	**FC**:FundamentalsofComputers	2
	Total Credits	**23**

SEMESTER II

Code	Subject Name	Credits
----	LanguagePaper-II	3
100L2Z	EnglishPaper-II	3
120C2A	**CC-III**:Object Oriented Programming using C++	5
120C21	**CC-IV:** Object Oriented Programming using C++Practical	5
120E2A 120E2B 120E2C	**ElectiveCourse-IIGeneric/Discipline Specific:** MathematicsII StatisticsII FinancialAccountingII	3
120S21 100L2L 100L2M	**SEC-II**:OfficeAutomationPractical BasicTamil-II(OtherLanguageStudents) AdvancedTamil-II(OtherLanguageStudents)	2
120S2A	**SEC-III**:Quantitativeaptitude	2
	Total Credits	**23**

SEMESTER III

Code	Subject Name	Credits
----	LanguagePaper-III	3
200L3Z	EnglishPaper-III	3
220C3A	**CC-V:**DataStructures	5
220C31	**CC-VI:**DataStructuresPractical	5
220E3A 220E3B 220E3C	**EC-IIIGeneric/Discipline Specific:** MathematicsI StatisticsI CostandManagementAccounting-I	3
220S31	**SEC-IV:(EB):**WebPageDesignPractical	1
220S32	**SEC-V:**DesktopPublishingPractical	2
----	EnvironmentalScience	-
	Total Credits	**22**

SEMESTER IV

Code	Subject Name	Credits
----	LanguagePaper-IV	3
200L4Z	EnglishPaper-IV	3
220C4A	**CC-VII:**JavaProgramming	5
220C41	**CC-VIII:**JavaProgrammingPractical	5
220E4A 220E4B 220E4C	**EC-IV:**Generic/DisciplineSpecific: MathematicsII StatisticsII CostandManagementAccounting-II	3
220S4A	**SEC-VII:**EmotionalIntelligence	2
220S4B	**SEC-VII:**TechnicalWriting	2
220V4A	EnvironmentalScience	2
	Total Credits	**25**

SEMESTER V

Code	Subject Name	Credits
320C5A	**CC-IX:**OperatingSystem	3
320C5B	**CC-X:**RelationalDatabase Management System	4
320C5C	**CC-XI:**WebTechnology	5
320C51	**CC-XII:**WebTechnologyPractical	5
	EC -V:	
320E5A	OperationsResearch	3
320E5B	SoftwareEngineering	
320E5C	AgileProjectManagement	
	EC -VI:	
320E5D	CloudComputing	3
320E5E	BigDataAnalytics	
320E5F	IntroductionToDataScience	
320V5A	ValueEducation	2
320V5B	Internship/IndustrialTraining(Duringsummer vacation at the end of IV semester)	2
	Total Credits	**27**

SEMESTER VI

Code	Subject Name	Credits
320C6A	**CC- XIII:**R-Programming	4
320C61	**CC- XIV:**R-ProgrammingPractical	4
320C6B	**CC- XV:**AdvancedNetworking	3
	EC-VII:	
320E6A	MobileAd-hocNetwork	3
320E6B	DataMiningandWarehousing	
320E6C	GridComputing	
	EC-VIII:	
320E6D	InternetofThingsanditsApplications	3
320E6E	RoboticsandItsApplications	
320E6F	NetworkSecurity	
320S61	ProfessionalCompetencySkillCourse:Mini Project	2
320V6A	ExtensionActivity	1
	Total Credits	**20**

I Year I Semester
Python Programming
C.O. To Enable the students to know about the concepts and principles of python and acquire skills in programming in python.
CO1: Develop and execute simple Python programs.
CO2: Write simple Python programs using conditionals and looping for solving problems.
CO3: Decompose a Python program into functions.
CO4: Represent compound data using Python lists, tuples , dictionaries etc.
CO5: Read and write data from/to files in Python programs
Python Programming Practical
C.O. To facilitate the students to attain the python programming features in practical applications.
CO1: To understand the problem solving approaches.
CO2: To learn the basic programming constructs in Python.
CO3: To practice various computing strategies for Python-based solutions to real world problems.
CO4: To use Python data structures - lists, tuples, dictionaries.
CO5: To do input/output with files in Python.
ELECTIVE COURSE I-Mathematics I
Mathematics I
C.O. To Enable the students to analyze and make decision on Assignment and Transportation problems Simple Harmonic Motion and to solve real world problems on Sequencing and Network and its applications.
CO 1: Understand the concepts of Summation of Series.
CO 2: Understand the concepts of Cayley Hamilton Theorem and inverse matrices.
CO 3: Understand the concepts of finite differences.
CO 4: Understand the knowledge about expansions, hyperbolic and inverse hyperbolic functions.
CO 5: Understand the concept of Leibnitz theorem and functions of two variables.
Statistics-I
C.O. To Enable the students to know about the concepts and acquire skills in statistics.

CO 1: Know the uses of statistics in society.
CO 2: Organize, manage and present data.
CO 3: Analyze the statistical data graphically using frequency distribution and cumulative frequency distribution.
CO 4: Analyze statistical data using measures of central tendency, dispersion and location.
CO 5: To understand correlation between continuous variables and association between categorical variables.
Financial Accounting-I
C.O. To enable the students to know the Principles of Accounting in General and to Understand the System of Keeping Financial Accounting Records.
COI: Understand the role of accounting structure.
COII: concepts of depreciation accounting and single entry.
COIII: Demonstrate knowledge of branch accounts and departmental accounts.
COIV: Understand the concepts of high purchase and installment purchase and sale or return.
COV: Demonstrate an understanding of partnership accounts.
Skill Enhancement Course: Office Automation
C.O. To impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point and to acquire knowledge on editor, spread sheet and presentation software.
CO1: Understand the basics of computer systems and its components.
CO2: Understand and apply the basic concepts of a word processing package.
CO3: Understand and apply the basic concepts of electronic spreadsheet software.
CO4: Understand and apply the basic concepts of database management system.
CO5: Understand and create a presentation using PowerPoint tool.
Foundation Course: Fundamentals of Computers
C.O. To enable the students to understand fundamentally the general scope of the computer system, to know the uses of the basic components of the computer, and to know some basic things about the computer and the world.
CO1: Fundamental concepts of computer.
CO2: Fundamental mathematical techniques and how they relate to computer.
CO3: The architecture of processing and file storage in a computer system.
CO4: Basic operations of operating systems.

CO5: A variety of software packages applicable to an academic, software development and business environment.

I Year II Semester

Object Oriented Programming using C++

C.O. To engender an appreciation for the need and characteristics of Object-orientation and to impart knowledge of the C++ language grammar in order to design and implement programming solutions to simple problems by applying Object-oriented thinking.

CO1: Explain the various basic concepts of Object-orientation.

CO2: Write programs to implement static binding.

CO3: Write programs to implement inheritance and dynamic binding.

CO4: Write programs to implement templates and exception handling and learn how to use STL class library.

CO5: Write programs implementing File and Stream I/O.

Object Oriented Programming using C++ Practical

C.O. To facilitate the students to design classes for the given problems to write programs in C++ and to Code, debug and execute a C++ program to solve the given problems using an IDE.

CO1: Design and create classes. Implement Stream I/O as appropriate.

CO2: Design appropriate data members and member functions.

CO3: Implement functions, friend functions, static members, constructors and compile-time polymorphism.

CO4: Implement inheritance, run-time polymorphism and destructors.

CO5: Implement templates and exceptions. Use STL class library. Implement File I/O.

ELECTIVE COURSE II

MATHEMATICS – II

C.O. To acquire knowledge in Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

CO1: Understand the various concepts of Bernoulli's and Reduction Formula.

CO2: Understand the concepts of Fourier Series.

CO3: Understand the concepts of Non-Homogenous and Partial Differential Equations.

CO4: Understand the Laplace Transforms.

CO5: Understand the concepts of Vector Differentiation.

Statistics II

C.O. To acquire knowledge in Understand Probability and its properties to Learn characteristics of different discrete and continuous distributions, Know situation to which different distributions can be applied, Comprehend the Sampling distributions and to Learn how to apply statistical tests to get information from data.

CO1: Understand the basic concept of Probability.

CO2: Identify the characteristics of different discrete and continuous distributions.

CO3: Identify the type of statistical situation to which different distributions can be applied comprehend the Sampling distributions.

CO4: Understand how to apply statistical tests to get information from data.

CO5: Understand the concepts of testing.

FINANCIAL ACCOUNTING – II

C.O. To gain knowledge on the preparation of subsidiary and Cash book to know the methods of calculating Fire Insurance Claims to familiarize with the accounting treatment of Non-Profit Organization to learn the methods of accounting treatment of Bills of Exchange and to gain knowledge on the accounting treatment of Royalty Accounts.

CO1: Remember the concept of subsidiary and cash book.

CO2: Apply the knowledge in preparing accounts of Fire Insurance Claims.

CO3: Analyse the accounting treatment of Non-Profit Organization.

CO4: Evaluate the accounting treatment of Bills of Exchange.

CO5: Determine the royalty accounting treatment.

SEC-II: Office Automation Practical

CO: To impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point and to acquire knowledge on editor, spread sheet and presentation software.

CO1: Understand the basics of computer systems and its components.

CO2: Understand and apply the basic concepts of a word processing package.

CO3: Understand and apply the basic concepts of electronic spreadsheet software.

CO4: Understand and apply the basic concepts of database management system.

CO5: Understand and create a presentation using PowerPoint tool.

Quantitative Aptitude

CO: To improve the quantitative skills of the students and to prepare the students for various

competitive exams.

CO1: To gain knowledge on LCM and HCF and its related problems.

CO2: To get an idea of age, profit and loss related problem solving.

CO3: Able to understand time series simple and compound interests.

CO4: Understanding the problem related to probability, and series.

CO5: Able to understand graphs, charts.

II Year III Semester

Data Structures

CO: To impart the basic concepts of data structures and algorithms and to acquaint the student with the basics of the various data structures and gives insight into the various algorithm design techniques.

CO1: To introduce the concepts of Data structures and to understand simple linear data structures.

CO2: Learn the basics of stack data structure, its implementation and application.

CO3: Use the appropriate data structure in context of solution of given problem and demonstrate a familiarity with major data structures.

CO4: To introduce the basic concepts of algorithms.

CO5: To give clear idea on algorithmic design paradigms like Divide and conquer and Backtracking.

Web Page Design Practical

CO: To develop the skill & knowledge of Web page design, multimedia and Web site development.

CO1: Define the principle of Web page design.

CO2: Define the basics in web design.

CO3: Visualize the basic concept of HTML.

CO4: Recognize the elements of HTML.

CO5: Introduce basics concept of CSS.

Desktop Publishing Practical

CO: To make the students understanding of the techniques in desktop publishing using suitable hardware and software tools.

CO1: Understand basics of computer and its related terminology..

CO2: Write, Edit & Print documents using MS-WORD & EXCEL.

CO3: Understand various software used for Desktop Publishing and would be able to create and design documents with text and graphics like newspaper ad, wedding cards, visiting cards, greeting cards etc.

CO4: Using PageMaker, CorelDraw & Photoshop.

CO5: Understand Color concept in Printing.

YEAR – II SEMESTER – IV

Java Programming

C.O. This course is designed to create Java programs that leverage the object-oriented features of the Java language and AWT controls, Event Handling and Swing for GUI

CO1: Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java

CO2: Implement inheritance, packages, interfaces and exception handling of Core Java.

CO3: Implement multi-threading and I/O Streams of Core Java

CO4: Implement AWT and Event handling.

CO5: Use Swing to create GUI.

Java Programming Practical

C.O. Enable the students to develop the programming skill using Java

CO1: Code, debug and execute Java programs to solve the given problems

CO2: Implement multi-threading and exception-handling

CO3: Implement functionality using String and String Buffer classes

CO4: Demonstrate Event Handling.

CO5: Create applications using Swing and AWT

Elective Courses

Mathematics II

C.O. Enable the students to study about mathematical concepts in assignment and transportation problem .To develop the skill relating to sequencing and network applications

CO1:Necessary skills to analyse and make decision on Assignment and Transportation problems Simple Harmonic Motion

CO2: To solve real world problems on Sequencing and Network and its applications

Statistics II

C.O. Aimed to familiarize the concept of Statistics.

CO1: Understand Probability and its properties

CO2: Learn characteristics of different discrete and continuous distributions.

CO3: Know situation to which different distributions can be applied.

CO4: Comprehend the Sampling distributions.

CO5: Learn how to apply statistical tests to get information from data

Cost and Management Accounting II

C.O. To teach the fundamentals of Cost and Financial Accounting. Aimed to familiarize the concept of Process Costing, Marginal costing.

CO1: To know the procedure for reconciliation of Cost and Financial Accounts

CO2: To gain knowledge regarding computation of Machine Hour Rate and Contract Account

CO3: To familiarize with the concept of Process Costing

CO4: To learn about Budget and Budgetary Control

CO5: To gain insights into Marginal Costing

Emotional Intelligence

C.O. To teach the basic concepts of emotional intelligence. To teach the students on aspects relating to personality Analysis Self-analysis, Positive and Negative traits.

CO1: After completion of subjects students understand and application of Emotional Intelligence

Technical Writing

C.O. To guide students towards rhetorical, professional, and compositional competencies necessary to ethically and effectively create and analyse technical documents and communication.

CO1: Students will learn to analyse communication-related problems and develop solutions through the composition of technical documents from a number of genres and within several settings (i.e., print, web, interactive software) and contexts (e.g., academic, corporate, non-profit, governmental).

CO2: Students will explore rhetorical and professional strategies in order to discover how to clearly identify and address audiences and stakeholders, organizational contexts, and ethical concerns in the act of communication

YEAR – III SEMESTER – V

Operating System

C.O. This course is designed to provide a comprehensive understanding of principles
And technical approaches in operating systems. The emphasis of the course will be
placed on understanding how the various elements of operating system interact and
Provides services for execution of applicationsoftware.

CO1: Know the fundamentals of Operating Systems.

CO2: Understanding of design issues associated with operating systems and various process management concepts including scheduling, synchronization, and deadlocks

CO3: Familiar with multithreading and concepts of memory management including Virtual Memory.

CO4:Know Issues related to file system interface and implementation, disk Management.

CO5: Familiar with protection and security mechanisms

Relational Database Management System

C.O. To enable the students to acquire the basic knowledge in DBMs, RDBMS and Analyse functional dependencies for designing robust Database.

CO1: Describe basic concepts of database system

CO2: Design a Data model and Schemas in RDBMS

CO3: Competent in use of SQL

CO4: Analyse functional dependencies for designing robust Database

Web Technology

C.O. To use PHP and MySQL to develop dynamic web sites for user on the Internet .To develop web sites ranging from simple online information forms to complex ecommerce sites with MySQL database, building, connectivity, and maintenance.

CO1: Understand the general concepts of PHP scripting language for the development of Internet websites.

CO2: Understand the basic functions of MySQL database program and XML concepts

CO3: Learn the relationship between the client side and the server side scripts.

Web Technology Practical

C.O. Enable the students to develop the programming skill to know about how to write PHP code to solve problems. Display and insert data using PHP and MySQL. Test, debug, and deploy web pages containing PHP and MySQL. Aims to introduce practical session to develop simple applications using PHP andMySQL.

CO1: Obtain knowledge and develop application programs using Python.

CO2: Create dynamic Web applications such as content management, user registration, and ecommerce using PHP and to understand the ability to post and publish a PHP website.

CO3: Develop a MySQL database and establish connectivity using MySQL.

Elective Courses

Operations Research

C.O. The Objective of the paper is to introduce the basic concepts of Operational Research and linear programming to the students

CO1: Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained.

CO2: Determine optimal strategy for Minimization of Cost of shipping of products from source to Destination/ Maximization of profits of shipping products using various methods, Finding initial basic feasible and optimal solution of the Transportation problems

CO3: Optimize the allocation of resources to Demand points in the best possible way using various techniques and minimize the cost or time of completion of number of jobs by number of persons.

CO4: Formulate Network models for service and manufacturing systems, and apply operations research techniques and algorithms to solve these Network problems

Software Engineering

C.O. The objective of the course is to enable students to understand and use a relational database system. Students learn how to design and create a good database and use various SQL operations. The course concludes with an overview of Transaction management and introduction to advanced and non-relational databases.
CO1: To analyze Data Base design methodology
CO2: Acquire knowledge in fundamentals of Data Base Management System. Introduction to Databases, Conceptual design using ERD, Functional dependencies and Normalization, Relational Algebra is covered in detail.
CO3: Be able to analyze the difference between traditional file system and DBMS.
CO4: Able to handle with different Data Base languages.
CO5: Draw various data models for Data Base and Write queries mathematically.

Agile Project Management

C.O. The objective of the course is to provide a good understanding of software design and a set of software technologies and APIs. To provide a detailed examination and demonstration of Agile development and testing techniques. To provide an understanding of the benefits and pitfalls of working in an Agile team
CO1: Understanding of the Agile manifesto and its advantages over other SDLC paradigms
CO2: Understanding essential Agile concepts
CO3: Understanding how to plan and execute a project using Agile concepts
CO4: Understanding Agile management concepts.
CO5: Practical application of Agile principles

Cloud Computing

C.O. To enable the students to know the common features and differences in the service offerings of the three major Cloud Computing service providers, namely Amazon, Microsoft and Google. To provide know-how of the various aspects of application design, benchmarking and security on the Cloud
CO1: To understand the concepts and technologies involved in Cloud Computing.
CO2: To understand the concepts of various cloud services and their implementation in the Amazon, Microsoft and Google cloud computing platforms.
CO3: To understand the aspects of application design for the Cloud.
CO4: To understand the concepts involved in benchmarking and security on the Cloud.
CO5: To understand the way in which the cloud is used in various domains.

Big Data Analytics

C.O. Aim to know the fundamental concepts of big data and analytics. To explore tools and

practices for working with big data.
CO1: Work with big data tools and its analysis techniques
CO2: Analyze data by utilizing clustering and classification algorithms.
CO3: Learn and apply different mining algorithms and recommendation systems for large volumes of data.
CO4: Perform analytics on data streams.
CO5: Learn NoSQL databases and management.

Introduction To Data Science

C.O. To enable students to Understand the basics of the Supervised learning. An overview of simple statistical models and the basics of machine learning techniques of regression.
CO1: Clean and reshape messy datasets
CO2: Use exploratory tools such as clustering and visualization tools to analyze data
CO3: Perform linear regression analysis
CO4: Use methods such as logistic regression, nearest neighbors, decision trees, support vector machines, and neural networks to build a classifier
CO5: Apply dimensionality reduction tools such as principal component analysis

YEAR – III SEMESTER – VI

R-Programming

C.O. To Enable the students to know about the concepts and principles of R-Programming and acquire skills in programming in R-Programming
CO1: To understand the problem solving approaches
CO2: To learn the basic programming constructs in R Programming
CO3: To learn the basic programming constructs in R Programming
CO4: To use R Programming data structures - lists, tuples, and dictionaries.
CO5: To do input/output with files in R Programming.

R-Programming Practical

C.O. To facilitate the students to attain the R programming features in practical applications.
CO1: To understand the problem solving approaches
CO2: To learn the basic programming constructs in R Programming
CO3: To practice various computing strategies for R Programming -based solutions to real world problems
CO4: To use R Programming data structures - lists, tuples, and dictionaries.
CO5: To do input/output with files in R Programming

Advanced Networking

CO: To make the students understand   the concept of Data communication and Computer network, routing algorithms and to gain the knowledge on Security over Network communication.

CO1: To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models
CO2: To gain knowledge on Telephone systems and Satellite communications
CO3: To impart the concept of Elementary data link protocols
CO4: To analyze the characteristics of Routing and Congestion control algorithms
CO5: To understand network security and define various protocols such as FTP, HTTP, Telnet.

Elective Course

Mobile Ad-hoc Network

C.O. To enable students to develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
CO1: Understand the basic concepts ad-hoc networks and ad-hoc mobility models
CO2: Acquire knowledge about Medium access protocols and standards like IEEE 802.11a and HIPERLAN.
CO3: Identify the significance of Routing protocols and analyze about routing Algorithm.
CO4: Understand about the applications of end-end delivery and security issues in ad-hoc networks
CO5: Analyze and understand the concept of cross-layer design and parameter optimization techniques

Data Mining and Warehousing

C.O. To impart the basic concepts the knowledge on Data Mining and Warehousing concepts and techniques. To acquaint the student with the basics of the cluster analysis and typical clustering methodologies, algorithms, and applications
CO1: To understand the basic concepts and the functionality of the various data mining and data warehousing component
CO2: To know the concepts of Data mining system architectures
CO3:To analyse the principles of association rules
CO4: To get analytical idea on Classification and prediction methods
CO5: To Gain knowledge on Cluster analysis and its methods.

Grid Computing

C.O. The objective of the course is to provide the knowledge on the basic construction and use of Grid computing and grid computing applications
CO1: To understand the basic elements and concepts related to Grid computing
CO2: To identify the Grid computing toolkits and Framework.
CO3: To know about the concepts of Virtualization
CO4: To analyse the concept of service oriented architecture.
CO5: To Gain knowledge on grid and web service architecture

Internet of Things and its Applications

C.O. To enable students to understand the concepts of Internet of Things and the application of IoT

CO1: Use of Devices, Gateways and Data Management in IoT.

CO2: Design IoT applications in different domain and be able to analyse their performance

CO3: Implement basic IoT applications on embedded platform

CO4: To gain knowledge on Industry Internet of Things

CO5: To Learn about the privacy and Security issues in IoT

Robotics and Its Applications

C.O. The objective of the course is to provide the knowledge familiar with the various drive systems of robots, sensors and their applications in robots To introduce the parts of robots, basic working concepts and types of robots

CO1: Describe the different physical forms of robot architectures

CO2: Kinematically model simple manipulator and mobile robots

CO3: Mathematically describe a kinematic robot system.

CO4: Analyse manipulation and navigation problems using knowledge of coordinate frames

Network Security

C.O. This course is designed to study the number theory used for network security and to understand the design concept of cryptography and authentication.

CO1: Identify the security issues in the network and resolve it.

CO2: Analyse the vulnerabilities in any computing system and hence be able to design a security solution.

CO3: Evaluate security mechanisms using rigorous approaches by key ciphers and Hash functions

CO4: Demonstrate various network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software etc

Mini Project

The student has to understand the real time software development environment. The student should gain a thorough knowledge in the problem, encouragement aof higher order thinking and problem solving skills. This helps students develop teamwork and problem solving skills, along with the ability to communicate effectively with others.