



RAJAGIRI VISWAJYOTHI
COLLEGE OF ARTS AND APPLIED SCIENCES
VENGOOR , PERUMBAVOOR KERALA- 683546

An ISO 9001 : 2015 Certified Institution

Affiliated to Mahatma Gandhi University, Kottayam | Approved by AICTE



CRITERION 1 - CURRICULAR ASPECTS

1.1 Curricular Planning and Implementation

2019-2024

Submitted to



Curriculum Planning

1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of Continuous Internal Assessment

Department of Computer Applications

Programme File



RAJAGIRI VISWAJYOTHI
COLLEGE OF ARTS AND APPLIED SCIENCES
VENGOOR , PERUMBAVOOR KERALA- 683546

Programme File

BACHELOR OF COMPUTER APPLICATIONS

Prepared By

Department of Computer Applications

Rajagiri Viswajyothi College of Arts and Applied Sciences

Vengoor, Perumbavoor

(2017 Admission Onwards)



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1. DEPARTMENT PROFILE

About the Department

The Department of Computer Applications was established in 2023, marking a significant milestone for the college. Offering a **Bachelor of Computer Applications (BCA)** program, the department commenced with a sanctioned strength of 40 seats. Equipped with a computer lab and comprehensive internet facilities, the department provides an excellent infrastructure for students to enhance their technical skills. In addition to the core academic curriculum, the department actively organizes various co-curricular activities aimed at boosting the knowledge and competencies of the students. An integral part of the department is the '**Coding Club**,' which fosters a collaborative environment for students to hone their coding skills, engage in problem-solving, and participate in programming competitions. The Department of Computer Applications is dedicated to nurturing the next generation of tech professionals through a blend of rigorous academics and enriching co-curricular experiences.

2. PROGRAMMES OFFERED BY THE DEPARTMENT

- Bachelor of Computer Applications(BCA)

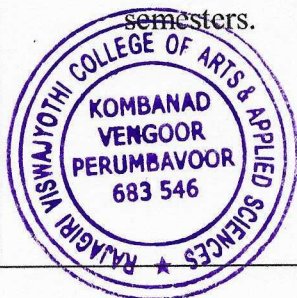
3. PROGRAMME OBJECTIVE

The Programme in Computer Application is designed with the following specific objectives.

- (a) To attract young minds to the potentially rich & employable field of computer applications.
- (b) To be a foundation graduate programme which will act as a feeder course for higher studies in the area of Computer Science/Applications.
- (c) To develop skills in software development so as to enable the graduates to take up self employment in Indian & global software market.
- (d) To Train & Equip the students to meet the requirement of the Industrial standards

4. DURATION OF BCA PROGRAMME

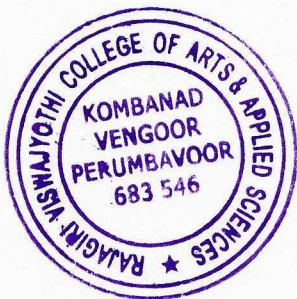
The programme shall normally extend over a period of three academic years consisting of six semesters.



PROGRAMME OUTCOMES**BA / BSc / B. Com / BCA / BBA - Programme Outcomes**

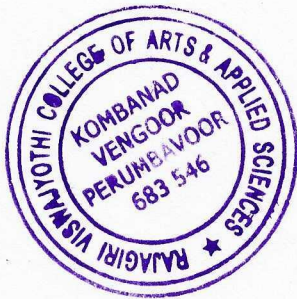
On completion of Undergraduate Programme, the student is expected to achieve the following programme outcomes:

- **PO1: Critical Thinking and Analytical Reasoning**
Utilize logical reasoning and critical thinking skills gained from classroom and lab courses in real-world scenarios.
- **PO2: Communication Skills**
Develop effective communication skills through seminars, project presentations and classroom activity to utilize them in practical situations for meaningful interactions with people, organizations and government bodies.
- **PO3: Problem Solving Skills**
Apply acquired knowledge, logic, skills, and attitudes from informed learning to assess and resolve challenging professional problems effectively.
- **PO4: Computational and Observational Skills**
Apply a data-driven approach to classify, analyse, and interpret data using computing technology tools to develop practical solutions and demonstrate observational skills in real-life scenarios.
- **PO5: Technological Competence**
Use relevant technologies effectively in their field of study and professional practice and stay current with technological advancements and their implications.
- **PO6: Personal Development and Social Responsibility**
Develop self-awareness, self-discipline, and the ability to manage time and resources effectively and recognize the importance of social responsibility and contribute positively to society.



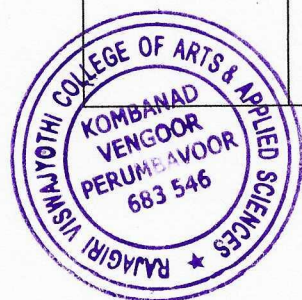
6. PROGRAMME SPECIFIC OUTCOMES

- **PSO1:** Develop proficiency in various programming languages and tools to design and implement algorithms and software solutions.
- **PSO2:** Understand and apply software principles to develop user-friendly software applications.
- **PSO3:** Design, implement, and manage database systems to handle large volumes of data proficiency in SQL databases, and knowledge of database normalization, transactions, and security.

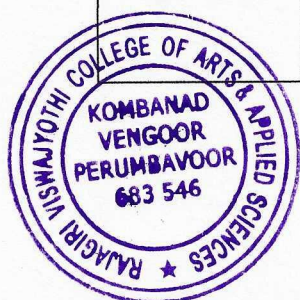


COURSE OUTCOME

SEMESTER	COURSE CODE	COURSE TITLE	CO	COURSE OUTCOME
1	EN1CC01	English Common Course I - Fine- Tune your English	CO1	Understand the key methodologies used in literary analysis and their historical development.
			CO2	Apply various literary theories to interpret and critique different texts.
			CO3	Analyse the impact of cultural, social, and historical contexts on literary works.
			CO4	Understand the influence of different critical perspectives on the interpretation of literary texts.
			CO5	Apply research skills to conduct independent literary studies and present findings effectively.
1	CA1CRT01	Computer Fundamental and Digital Principles	CO1	Bridge the fundamental concepts of computers with the present level of knowledge of the students
			CO2	Familiarize operating systems, programming languages, peripheral devices, networking, multimedia and internet
			CO3	Understand binary, hexadecimal and octal number systems and their arithmetic.
			CO5	Demonstrate the building up of Sequential and combinational logic from basic gates.



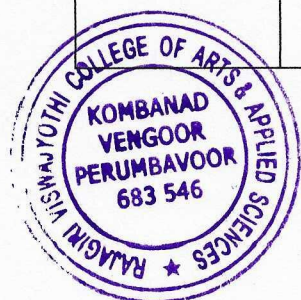
1	CA1CRT02	Methodology of Programming and C Language	CO1	Students would be able to read, understand and trace the execution of programs written in C Language.
			CO2	Students would be able to write C programs for a given algorithm.
			CO3	Students would be able to implement programs with control structures, functions, arrays and pointers.
			CO4	Students would be able to write programs that perform operations using structure, union and other user defined datatypes.
1	CA1CRP01	Software Lab I	CO1	Develop the logic to solve the given problem.
			CO2	Write programs using control structures in C.
			CO3	Write programs based on arrays and strings
			CO4	Write programs using user-defined functions, structures and pointers
1		Discrete Mathematics 1	CO1	Understand and apply propositional logic, including propositional equivalence, predicates, quantifiers, and rules of inference
			CO2	Define and manipulate sets, perform set operations, and analyze functions, sequences, and summations.
			CO3	Explore the properties of integers, division, prime numbers, greatest common divisors, and their applications in number theory and cryptosystems.



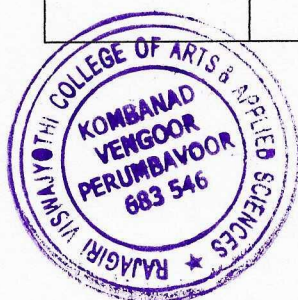
			C03	Students should be able to develop solutions for a range of problems using objects and classes.
			C04	Students should be able to understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
2		Discrete Mathematics II	C01	Explore application of trees in computer science.
			C02	Learns about networks.
			C03	Explore the application of Boolean Algebra in the design of electronic circuits.
			C04	Able to set up and solve the augmented matrix associated with a linear system in three variables.
			C05	To improve problem solving skills.
3	CA3CRT06	Computer Graphics	C01	Understand hardware and software components of graphics systems and application areas of computer graphics.
			C02	Apply fundamental algorithms to generate lines and circles
			C03	Implement 2D geometric transformations and viewing algorithms.
			C04	Understand various 3D display methods and object Representation techniques.
			C05	Acquire the basic concepts of computer animations, Understand hardware and



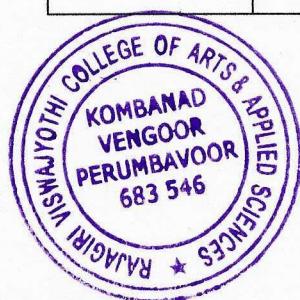
2	CA2CRT04	Computer Organization and Architecture	C01	Describe the fundamental organisation of a computer system
			C02	Explain the functional units of a processor
			C03	Explain addressing modes, instruction formats and program control statements
			C04	Distinguish the organization of various parts of a system memory hierarchy
			C05	Describe basic concept of parallel computing
			C06	Describe fundamentals concepts of pipeline and vector
2	CA2CRT05	Object Oriented Programming using C++	C01	To comprehend the basic object-oriented programming concepts in C++
			C02	Describe the constructors, destructors and operator overloading concepts in C++
			C03	Understand the concept of code reusability with the help of Inheritance.
			C04	Students should able to apply pointers, virtual functions and files in complex programming situations.
2	CA2CRP02	Software Lab II	C01	Students should able to formulate query, using SQL, solutions to a broad range of query and data update problems.
			C02	Students should able to transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.



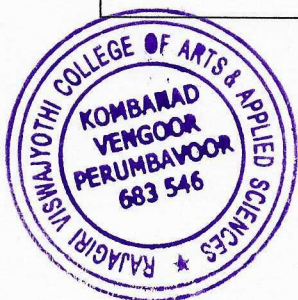
			CO4	Analyze relations, their properties, representation methods, equivalence relations, and partial orderings
1		Basic Statistics & Introductory Probability Theory	CO1	To develop the student's ability to deal with numerical and quantitative issues in computer science
			CO2	To enable the use of statistical, graphical and algebraic techniques whenever relevant
			CO3	To understand different types of distribution and its application.
			CO4	Able to demonstrate their understanding of descriptive statistics by practical application of quantitative reasoning and data visualization
		English Common Course II- Issues that Matter	CO1	Help the learners to evaluate the contemporary issues of concern
			CO2	Examine the major issues of contemporary significance
			CO3	Create awareness in learners to respond rationally and positively to the issues raised in Society
			CO4	Internalise the values imparted through the selections in the works provided.
2	CA1812103	Data Base Management Systems Core	CO1	Practice with the SQL queries
			CO2	Understand ER model
			CO3	Understand how to design database
			CO4	Understand transaction processing



		Microprocessor and PC Hardware	CO2	Understand the architecture of 8085 microprocessor.
			CO3	Understand the instruction set and addressing modes of 8085 microprocessor.
			CO4	Identify the components of a motherboard.
			CO5	Acquire the basic understanding of memory modules and the logical memory layout
3	CA1813603	Software Lab III	CO1	Discuss the provisions in C++ to organize and manipulate data structures using array
			CO2	Understand stack and queue executions in terms of C++ derived data type.
			CO3	Apply the concepts of dynamic memory allocation for the formation of linked list and for garbage collection
			CO4	Apply tree terminology for data manipulations
		Advanced Statistical Methods	CO1	To understand the concept of the sampling distribution of a statistical and the behaviour of sample mean.
			CO2	Apply inferential methods relating to the means of normal distribution.
			CO3	Able to demonstrate their knowledge of the basics of inferential statistics by making valid generalization from sample data.



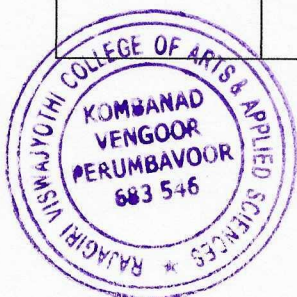
				software components of graphics systems and application areas of computer graphics. Apply fundamental algorithms to generate lines and circles. Implement 2D geometric transformations and viewing algorithms.
3	CA1813109	Data Structure using C++	CO1	Implement sorting and searching algorithms using Arrays
			CO2	Apply various data structure stacks, queues using arrays
			CO3	Implement linked list using dynamic memory allocation
			CO4	Show tree traverse technique to various applications
3	CA3CRT08	Operating Systems	CO1	Acquire the basic understanding of Operating system.
			CO2	Understand the concepts of process and various process Scheduling Algorithms.
			CO3	Appraise the design of various algorithms for process Synchronization and deadlock handling.
			CO4	Analyze various memory management techniques.
			CO5	Master concepts related to file system interface, implementation and disk management.
3	CA3CRT07		CO1	Understand the functionality and features of CPU.



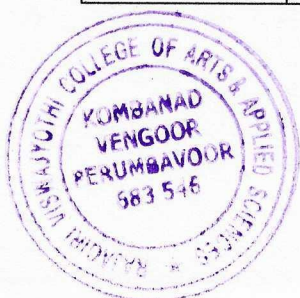
			C04	Able to demonstrate their knowledge of the basics of inferential statistics by making valid generalization from sample data.
4	CA4CRT10	Design and Analysis of Algorithms	C01	Students should able to define the basic concepts of algorithms and analyze the performance of algorithms.
			C02	Students should able to use various algorithm design techniques or developing algorithms.
			C03	Students should able to estimate time complexity of various searching and sorting algorithms
4	CA4CRT11	System analysis & Software Engineering	C01	Understand the basics of business information systems
			C02	Understand the basics of software engineering and life cycle models
			C03	Identify software requirements engineering and project planning activities
			C04	Understand the software design framework and software reliability
			C05	Assimilate the knowledge of different software testing strategies.
4	CA4CRT13	Web Programming using PHP	C01	Students should able to understand the general concepts of PHP scripting language for the development of Internet websites



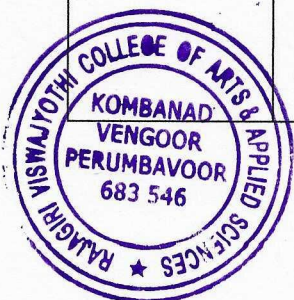
			C02	Students should able to understand the basic functions of MySQL database program.
			C03	Students should able to learn the relationship between the client side and the server side scripts
			C04	Students should able to develop a final project using the learned techniques
4	CA4CRT12	Linux Administration	C01	Students should able to understand the basic set of commands and utilities in Linux systems.
			C02	Understand the fundamental concepts of open-source operating system Linux
			C03	Understand the basic set of commands and editors in Linux operating system
			C04	Develop shell programs in Linux operating system
			C05	Understand the role and responsibilities of a Linux system administrator.
4	CA1CRP04	Software Lab IV	C01	Students should able to design a basic web site using HTML and CSS to demonstrate responsive web design
			C02	Students should able to display and insert data using PHP and MySQL
			C03	Students should able to test, debug, and deploy web pages containing PHP
			C04	Understand the basic commands in Linux.



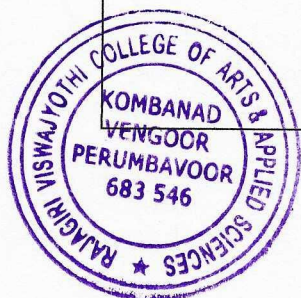
			C05	Practice shell scripting and essential shell programming
4		Operational Research	C01	To use different mathematical modelling techniques utilizing Operations Research methodology.
			C02	To find optimal solutions to problems
			C03	To learn various methods that are used for quantitative decision making
			C04	Able to realize that managerial problem situations have both quantitative and qualitative considerations that are important in the decision-making process.
5	CA5CRT14	Computer Networks	C01	Students should understand the basic concepts of computer networks.
			C02	Students should be able to know in depth about bandwidth utilization techniques
			C03	Understand error control and flow control in data communication
			C04	Understand various protocols in Data link, Network, Transport and Application layers
			C05	Understand network security
5	CA5CRT15	IT & Environment	C01	Students should able to recognize the importance of environment and the sustainable of natural resources
			C02	Students should able to analyze interaction between social and environmental processes.



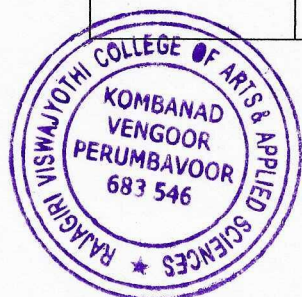
			CO3	Students should able to use scientific reasoning to identify and understand environment problems and evaluate potential solutions.
			CO4	Students should able to visualize the impacts of human activities on Environment and role of society in these impacts.
5	CA5CRT16	Java Programming Using Linux	CO1	Students should able to acquire the knowledge of the structure and model of the Java programming language,
			CO1	Students should able to use the Java programming language for various programming technologies
			CO3	Students should able to evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements
			CO4	Students should able to develop software in the Java programming language
5	CA5CRP05	Software Lab V	CO1	Students should able to demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
			CO2	Students should able to demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust



				faster and efficient application development
			CO3	Students should able to Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
			CO4	Students should able to Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes
5	CA5CRP06	Software Development Lab1	CO1	Students should able to identify the requirements for the real world problems.
			CO2	Students should be able to demonstrate and build the project successfully by hardware requirements, coding, emulating and testing
			CO3	Students should able to report and present the findings of the study conducted in the preferred domain
			CO4	Students should able to demonstrate an ability to work in teams and manage the conduct of the research study
			CO2	Assisting students to be expertise in computer related jobs
			CO3	Developing practical skills in internet
6	CA6ELT01	Data Mining(T)	CO1	Acquire the basic understanding of data mining functionalities and data preprocessing.



			C02	Understand the concept of Data Warehouse and OLAP technology.
			C03	Understand various classification, prediction and association mining methods.
			C04	Acquire knowledge about various clustering methods.
			C05	Master concepts related to mining complex data.
6	CAC6RT17	Cloud Computing	C01	Students should able to articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing
			C02	Students should able to identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
			C03	Students should able to explain the core issues of cloud computing such as security, privacy, and interoperability.
			C04	Students should able to provide the appropriate cloud computing solutions and recommendations according to the applications used
6	CAC6RT18	Mobile Application	C01	Students should able to install and configure Android application development tools.



		Development - Android	CO2	Students should able to design and develop user Interfaces for the Android platform.
			CO3	Students should able to save state information across important operating system events
			CO4	Students should able to apply Java programming concepts to Android application development.
			CO5	Students should able to demonstrate a sound technical knowledge of their selected project topic.
			CO6	Students should able to undertake problem identification, formulation and solution
			CO7	Students should able to design engineering solutions to complex problems utilizing a systems approach.
			CO8	Students should able to conduct an engineering project
6	CA6CRP08		Main project- Software Development Lab II	CO1
		CO2		Students should able to undertake problem identification, formulation and solution

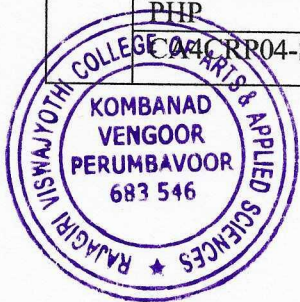


			C03	Students should able to design engineering solutions to complex problems utilizing a systems approach.
			C04	Students should able to conduct an engineering project
6	CA6CRP08	Viva Voce	C01	Students should able to face interview both in the academic and the industrial sector
			C02	Students should able to get an overall knowledge in the relevant field of computer applications.
			C03	Students should able to serve industry requirement.
6	CA6CRP07	Software Lab VI & Seminar	C01	Students should able to apply essential Android Programming concepts & uses interactive interfaces
			C02	Students should able to develop Android applications related to mobile related server-less database like SQLITE
			C03	Students should able to develop various Android applications related to layouts



Consolidated Scheme – I to VI Semesters of BCA

Sem	Title with Course Code	Course Category	Hours per week	Credit	Marks		
					Intl	Extl	Total
I	English-I	Common	5	4	20	80	100
	Mathematics	Complementary	4	4	20	80	100
	Basic Statistics	Complementary	4	4	20	80	100
	CA1CRT01 -Computer Fundamentals and Digital Principles	Core	4	4	20	80	100
	CA1CRT02-Methodology of Programming and C Language	Core	4	3	20	80	100
	CA1CRP01-Software Lab I (Core)	Core	4	2	20	80	100
II	English-II	Common	5	4	20	80	100
	Discrete Mathematics	Complementary	4	4	20	80	100
	CA2CRT03 -Data Base Management Systems	Core	4	3	20	80	100
	CA2CRT04-Computer Organization and Architecture	Core	4	4	20	80	100
	CA2CRT05-Object oriented programming using C++	Core	3	4	20	80	100
	CA2CRP02-Software Lab- II	Core	5	2	20	80	100
III	Advanced Statistical Methods	Complementary	4	4	20	80	100
	CA3CRT06-Computer Graphics	Core	4	4	20	80	100
	CA3CRT07-Microprocessor and PC Hardware	Core	3	4	20	80	100
	CA3CRT08-Operating Systems	Core	4	4	20	80	100
	CA3CRT09-Data Structure using C++	Core	4	3	20	80	100
	CA3CRP03-Software Lab III	Core	6	2	20	80	100
IV	Operational Research	Complementary	4	4	20	80	100
	CA4CRT10-Design and Analysis of Algorithms	Core	4	4	20	80	100
	CA4CRT11- System Analysis & Software Engineering	Core	4	4	20	80	100
	CA4CRT12-Linux Administration	Core	4	4	20	80	100
	CA4CRT13-Web Programming using PHP	Core	3	3	20	80	100
	CA4CRP04-Software Lab IV	Core	6	2	20	80	100



V	CA5CRT14-Computer Networks	Core	3	4	20	80	100
	CA5CRT15-IT and Environment	Core	4	4	20	80	100
	CA5CRT16-Java Programming using Linux	Core	3	3	20	80	100
	CA5OPT-- Open Course	Core	4	3	20	80	100
	CA5CRP05 -Software Lab V	Core	5	2	20	80	100
	CA5CRP06-Software Development Lab I (Mini Project in PHP)	Core	6	2	20	80	100
VI	CA6CRT17-Cloud Computing	Core	4	4	20	80	100
	CA6CRT18 -Mobile Application development- Android	Core	4	4	20	80	100
	CA6PET-- -Elective	Core	4	4	20	80	100
	CA6CRP07 -Software Lab VI & Seminar	Core	6	2	100	-	100
	CA6CRP08 -Software Development Lab II (Main Project)	Core	7	3	20	80	100
	CA6VVT01-Viva Voce	Core		1	-	100	100

Open Course(OP): CA5OPT01 : Informatics and Cyber Ethics, CA5OPT02 : Computer Fundamentals, Internet & MS Office.

Electives (PE): CA6PET01: Data Mining, CA6PET02: Digital Image Processing, CA6PET03: Soft Computing Techniques.



SYLLABUS- BCA- SEMESTER I

CA1CRT01 : Computer Fundamentals and Digital Principles (Core)

Theory:4 hrs. per week

Credits:4

Unit-1: (12 hrs.)

Introduction: Functional units of a computer system, Different types of computers, Computer Software and Hardware, Types of software-System software and Application programme. Characteristic of computers. Input Devices – Keyboard, Mouse, Optical input devices, Output devices – Monitors and Printers.

Unit-2: (10 hrs.)

Introduction to Operating Systems and Networking: Definition of an Operating System - Different types of PC Operating Systems. Computer Networks- categories of networks - LAN, WAN,MAN. The Internet - Working of Internet - Major Features of Internet.

Unit 3: (12 hrs.)

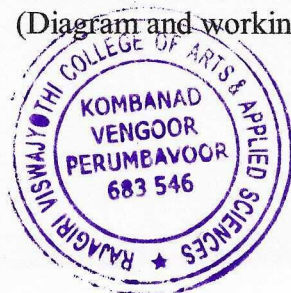
Number Systems: Base or radix ,Positional number system, Popular number systems(Decimal, Binary, Octal and Hexadecimal), Conversion-From one number system to another, Concept of binary addition and subtraction, Complements in binary number systems,1^s Complement, 2^s Complement and their applications, Signed magnitude form, BCD numbers- concept and addition.

Unit 4: (20 hrs.)

Boolean Algebra and Gate Networks: Logic gates- AND, OR, NOT, NAND and NOR Truth tables and graphical representation, Basic laws of Boolean Algebra, Simplification of Expressions, De Morgans theorems, Dual expressions, Canonical expressions, Min terms and Max terms, SOP and POS expressions, Simplification of expression using K-MAP (up to 4 variables), Representation of simplified expressions using NAND/NOR Gates, Don't care conditions, XOR and its applications, parity generator and checker.

Unit5: (18 hrs.)

Sequential and Combinational Logic. Flip flops- Latch, Clocked, RS, JK, T, D and Master slave , Adders-Half adder, Full adder(need and circuit diagram), Encoders, Decodes, Multiplexers and Demultiplexers(working of each with diagram), Analog to digital and digital to analog converters (Diagram and working principle), : Concept of Registers, Shift Registers



Books of study :

1. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill
2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.
3. M Morris Mano-Digital Logic and Computer design, Fourth Edition, Prentice Hall.

References Text:

1. Thomas C Bartee- Digital computer Fundamentals, Sixth Edition, TATA McGraw Hill Edition
2. Thomas L Floyd- Digital Fundamentals, Ninth edition, PEARSON Prentice Hall.
3. Malvino & Leach- Digital Principles and Applications, Sixth Edition, Tata McGraw Hill, 2006

CA1CRT02 -Methodology Of Programming And C Language (Core)

Theory:4 hrs. per week

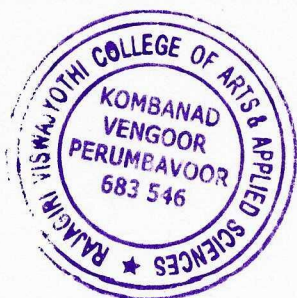
Credits:3

UNIT 1 (12 hrs.)

Introduction to programming, Classification of computer languages, Language translators (Assembler, Compiler, Interpreter), Linker, Characteristics of a good programming language, Factors for selecting a language, Subprogram, Purpose of program planning, Algorithm, Flowchart, Pseudocode, Control structures (sequence, selection, Iteration), Testing and debugging

UNIT 2(12 hrs.)

C Character Set, Delimiters, Types of Tokens, C Keywords, Identifiers, Constants, Variables, Rules for defining variables, Data types, C data types, Declaring and initialization of variables, Type modifiers, Type conversion, Operators and Expressions- Properties of operators, Priority of operators, Comma and conditional operator, Arithmetic operators, Relational operators, Assignment operators and expressions, Logical Operators, Bitwise operators.



UNIT 3 (15 hrs.)

Input and Output in C – Formatted functions, unformatted functions, commonly used library functions, Decision Statements If, if-else, nested if-else, if-else-if ladder, break, continue, goto, switch, nested switch, switch case and nested if. Loop control- for loops, nested for loops, while loops, do while loop.

UNIT 4(15 hrs.)

Array, initialization, array terminology, characteristics of an array, one dimensional array and operations, two dimensional arrays and operations. Strings and standard functions, Pointers, Features of Pointer, Pointer and address, Pointer declaration, void wild constant pointers, Arithmetic operations with pointers, pointer and arrays, pointers and two dimensional arrays.

UNIT 5(18 hrs.)

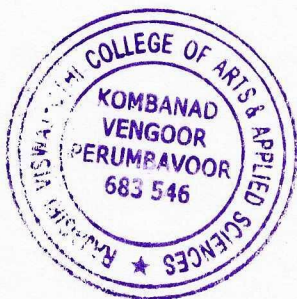
Basics of a function, function definition, return statement, Types of functions, call by value and reference. Recursion -Types of recursion, Rules for recursive function, direct and indirect recursion, recursion vs iterations, Advantages and disadvantages of recursion. Storage class, Structure and union, Features of structures, Declaration and initialization of structures, array of structures, Pointer to structure, structure and functions, typedef , bitfields , enumerated data types, Union, Dynamic memory allocation, memory models, memory allocation functions.

Book Of Study:

1. Ashok Kamthane - Programming in C, Third Edition, Pearson Education
2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

Reference Text

1. E. Balaguruswamy -Programming in ANSI C ,Seventh Edition , McGraw Hill Education
2. Byron Gotfried - Programming with C, Second Edition, Schaums Outline series. McGraw Hill



CA1CRP01-Software Lab I (Core)

Software Lab: 4 hrs. per week

Credits:2

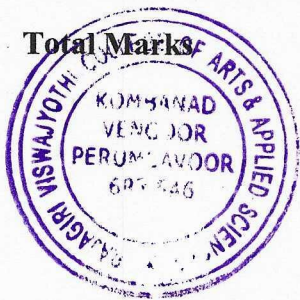
Syllabus

1. Programs to familiarize printf() and scanf() functions.
2. Programs Based on Decision statements , break, goto, continue, switch and Loop controls statements.
3. Programs Based on One dimensional and two dimensional arrays.
4. Programs on Strings and string handling functions.
5. Programs based on Pointers, operations on pointers, Arrays & Pointers,
6. Programs based on functions, Call by value, Call by reference, Recursion,
7. Programs based on structure and union, array of structures, Pointer to structure, structure and functions
8. Simple programs using pointers and malloc().

Scheme of Evaluation for software lab I external is as follows:

Division of Marks (Practical - 3 hours External)

First program from part 1& 2	- 25 marks
1. Flowchart	- 5 marks
2. Logic	- 10 marks
3. Successful compilation	- 5 marks
4. Result	- 5 marks
Second program should be based on advanced concepts ,part 3 to part 8	- 35 marks
1. Logic	- 20 marks
2. Successful compilation	- 10 marks
3. Result	- 5 marks)
Viva Voce	- 10 marks
Lab Record (minimum of 25 Programs)	- 10 marks
Total Marks	- 80 marks



BCA- SEMESTER II

CA2CRT03- Database Management Systems (Core)

Theory:4 hrs. per week

Credits:3

Unit 1: Introduction (12 hrs.)

Characteristics of the Database Approach – Database users :DBA , Database Designers ,End users – Advantages of using the DBMS Approach – Data models, Schemas , and Instances – Three- Schema Architecture and Data Independence.

DBMS Languages: DDL, DML – The Database System Environment: DBMS Component Modules.

Unit 2: Relational Model (16 hrs.)

Entity Relationship Modeling: Introduction –Entity Types , Entity Sets , Attributes and Keys – Relationship Types ,Relationship Sets, Roles , and Structural Constraints – Weak Entity Types – Notation for ER diagrams – Sample ER diagrams.

Relational Model concepts: Domains ,Attributes , Tuples , and Relations – Characteristics of Relations – Relational Model Constraints and Relational Database Schemas : Domain Constraints, Key Constraints , Relational Database Schemas , Entity Integrity , Referential Integrity, and Foreign Keys .

Unit 3: SQL(14 hrs.)

Data Types – Data Definition commands : CREATE , ALTER ,DROP - Adding constraints in SQL –

Basic SQL Queries : INSERT ,SELECT ,DELETE ,UPDATE - Substring comparison using LIKE operator ,BETWEEN operator – Ordering of rows – SQL set operations UNION , EXCEPT , INTERSECT – Complex Queries : Comparison involving NULL and Three-valued logic ,Nested queries , EXISTS and UNIQUE functions, Renaming of attributes and Joining of tables, Aggregate functions ,Grouping – Managing Views.

Unit 4: Normalization and Indexing Structures for Files(15 hrs.)

Normalization: Informal Design Guidelines for Relational Schemas –Functional Dependencies – Normal forms : First Normal Form , Second Normal Form , Third Normal Form – General Definitions of Second and Third Normal Forms –BCNF.

Indexing Structures for files: -Types of Single-Level Ordered Indexes: Primary Indexes, Clustering Indexes, and Secondary Indexes.

Unit 5: Transaction Processing and Database Security (15 hrs.)



Transaction Processing: Introduction to Transaction Processing - Transaction and System Concepts – Desirable properties of Transactions.

Database Security and Authorization: Types of Security – Control measures – Database Security and DBA – Access Control , User Accounts, and Database Audits –Access Control based on Granting and Revoking Privileges.

Books of study:

1. Ramez Elmasri and Shamkant B.Bavathe - DATABASE SYSTEMS , Sixth Edition, Pearson Education.

References:

1. C.J Date- An Introduction to Database Systems, Eighth edition, Pearson Education,2003
2. Reghu Ramakrishnan and Johannes Gehrke- Database Management Systems , Third edition, Mc Graw Hill International Edition.
3. Dipin Desai , An Introduction to Database Systems , First Edition, Galgoria Publications .

CA2CRT04 : Computer Organization and Architecture (Core)

Theory:4 hrs. per week

Credits:3

Unit 1: (12 hrs.)

Basic computer organization and design

Operational concepts, Instruction codes, Computer Registers, Computer Instructions, Memory locations and addresses, Instruction cycle, Timing and control, Bus organization.



Unit 2: (15 hrs.)

Central Processing Unit:

General Register Organization, Stack Organization, Addressing modes, Instruction Classification, Program control.

Unit 3: (16 hrs.)

Memory Organization

Memory Hierarchy, Main Memory, Organization of RAM, SRAM, DRAM, Read Only Memory- ROM-PROM, EPROM, EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.

Unit 4: (15 hrs.)

Parallel Computer Structures:

Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD.

Unit 5: (14 hrs.)

Pipelining and Vector processing: Introduction to pipelining, Instruction and Arithmetic pipelines (design) Vector processing, Array Processors.

Book of study :

1. M.Morris Mano-Computer Systems Architecture, Third Edition, Pearson Education
2. Kai Hwang and F A Briggs-Computer Architecture and parallel processing, McGraw Hills, 1990

Reference

1. Carl Hamacher -Computer Organization, Fifth Edition, Tata McGraw Hill.
2. John P Hayes -Computer Architecture & Organization -Mc Graw Hill
3. William Stallings-Computer Organization and Architecture , Seventh Edition, Pearson Education



CA2CRT05- Object Oriented Programming using C++ (Core)

Theory:3 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Principles of Object Oriented Programming, Beginning with C++

Procedure Oriented Programming-Object Oriented Programming-Basic concepts of object-oriented programming- Benefits of OOP- Applications of OOP-A simple C++program-Structure of C++ program-C++ data types- Symbolic constants- Reference by variables-Operators in C++- Operator precedence-Control structures- Function in C++ - The main function, Function prototyping- Call by reference- Return by reference- Inline function- Default arguments- Function overloading.

Unit 2: (10 hrs.)

Classes and Objects :Specifying a class- Defining member functions- Nesting of member functions - Private member functions - Arrays within a class - Memory allocation for objects-Static data members - Static member functions -Arrays of objects - objects as function arguments -Friendly functions- Returning Objects.

Unit 3: (12 hrs.)

Constructors and Destructors, Overloading

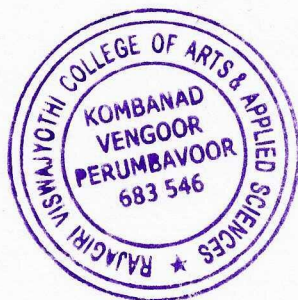
Constructors- Default constructor-Parameterized constructor-Copy constructor- Multiple constructors- Constructors with default arguments- Dynamic constructor-Destructors- Operator overloading- Unary and Binary operator overloading- Overloading using friends- Rules for overloading- Type conversion.

Unit 4: (10 hrs.)

Inheritance: Inheritance - Defining derived classes-Visibility modes-Single, Multilevel, Multiple, Hierarchical and Hybrid inheritance- Virtual base classes- Abstract classes- Constructors in derived classes- Nesting of classes.

Unit 5: (12 hrs.)

Pointers, Virtual Functions and Polymorphism, Working with Files :Pointers- Pointers to objects- this pointer-Pointers to derived classes- Virtual functions- Pure virtual functions- File Stream classes, Opening and closing a file- File opening modes- File pointers and their manipulations- Sequential input and output operations.



Book of Study:

1. E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.

Reference:

1. Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India
2. Robert Lafore, Object Oriented Programming in Turbo C++, First Edition, Galgotia Publications.
3. D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill.

CA2CRP02-Software Lab II (Core)

Software Lab: 5 hrs. per week

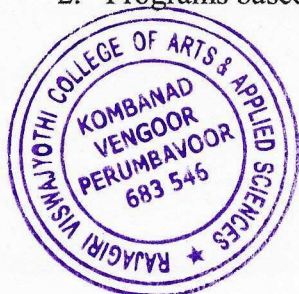
Credits:2

I. SQL Commands (2 hrs. per week)

1. Data definition commands - CREATE, ALTER, DROP, Adding Constraints Primary key, foreign key, unique key, check, not null.
2. Basic SQL queries INSERT, SELECT, DELETE, UPDATE, Using multiple tables, ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT, INTERSECT, Substring Comparison using LIKE operator, BETWEEN operator.
3. Complex Queries Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.
4. Managing views, Simple stored procedures.
5. Data Control commands - Access Control and Privilege commands.

II. Object Oriented Programming using C++ (3 hrs. per week)

1. Programs based on default arguments, function overloading.
2. Programs based on array of objects, friend functions, passing objects as arguments to function.



3. Programs based on operator overloading (binary, unary) using member functions and friend functions.
4. Programs based on constructors, different types of constructors.
5. Programs based on inheritance, different types of inheritance.

Scheme of Evaluation for software lab II external is as follows:

(There will be two questions; the first from DBMS and second from C++)

Division of Marks (Practical - 3 hours External)

First program - questions from DBMS **- 25 marks**

- | | |
|---------------------------|------------|
| 1. Logic | - 10 marks |
| 2. Successful compilation | - 8 marks |
| 3. Result | - 7 marks |

Second program – questions from Object Oriented Programming using C++ - **35 marks**

- | | |
|---------------------------|------------|
| 1. Logic | - 20 marks |
| 2. Successful compilation | -10 marks |
| 3. Result | - 5 marks |

Viva Voce **- 10 marks**

Lab Record **- 10 marks**

(DBMS -Minimum of 10 Programs

C++ -Minimum: of 15 Programs)

Total Marks **- 80 marks**



BCA- SEMESTER III

CA3CRT06 - Computer Graphics (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 : (12 hrs.)

Introduction: A survey of Computer Graphics, overview of graphics systems-Video display devices-Refresh CRT, Raster-Scan and Random-Scan Displays ,Color CRT Monitors, DVST, Flat-Panel Displays , Raster Scan systems, Random scan systems, Input devices, Hard copy devices, Graphics software.

Unit 2: (14 hrs.)

Output primitives: Line drawing algorithms: DDA algorithm, Bresenham's line algorithm, Circle generating algorithm- Midpoint circle algorithm, Character generation.

Unit 3: (18 hrs.)

2D geometric Transformations: Basic transformations: Translation, Rotation, Scaling; Other transformations-Reflection and shear, Matrix representation and homogenous coordinates, Composite transformation, Interactive picture construction Techniques.

Two-dimensional viewing: viewing pipeline, window and viewport, window to viewport transformation. Clipping operations- Point clipping, Line clipping:- Cohen Sutherland line clipping, Polygon clipping:- Sutherland- Hodgeman polygon clipping, Text Clipping.

Unit 4: (14 hrs.)

Three-dimensional concepts: Three dimensional display methods, Three dimensional object representations- Polygon surfaces, Sweep representations, Constructive solid geometry methods, octrees and quadtrees.

Unit 5 (14 Hrs)

Computer Animation: Design of animation sequences, raster animations, computer animation languages, key-frame systems, morphing, motion specifications.

Book of study :

1. Donald D.Hearn & M. Pauline Baker, Computer Graphics C Version, Second Edition,, PHI Pvt. Ltd.

References:

1. Newman W M & R F Sproul, Principles of Interactive Computer Graphics, Second Edition McGraw Hill Publishers.
2. Plastock R & Xiang Z, Theory and problems of computer Graphics, Second Edition Schaum Series, McGraw Hill Publishers.



CA3CRT07 -Microprocessors and PC Hardware (Core)

Theory:3 hrs. per week

Credits:3

Unit1: (10 hrs.)

Introduction : Evolution of microprocessors. **Introduction to the concept of 8085 microprocessor:** Intel 8085 introduction, Architecture ,Pin diagram, Instruction cycle, Timing diagrams, Interrupts of Intel 8085.

Unit 2 : (10 hrs.)

Instruction Set of Intel 8085 : Introduction, Instruction and data format, Addressing modes, Status flags, Intel 8085 instruction set.

Unit3: (12 hrs.)

Motherboard : Components of motherboard — expansion slots, Processor socket, coprocessor, memory modules, BIOS and CMOS, chipset. Super I/O chip, ROM BIOS, System buses- Processor Buses, Memory buses, I/O Bus(ISA,PCI Local Bus, AGP, USB), Motherboard selection criteria.

Unit4: (10 hrs.)

Hard disk: Hard Disk drive, Definitions, Hard Disk operations, Disk formatting, Basic hard disk drive components, Hard disk features, Hard disk drive installation procedure, FAT Disk, VFAT, FAT 32, NTFS.

Unit5: (12 hrs.)

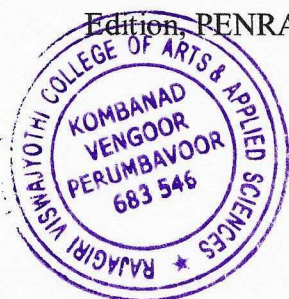
Types of memory: Physical Memory, Memory modules:- SIMMs, DIMMs, RIMMs, Brief study of conventional base memory, Upper memory area, High memory area, Extended memory, Expanded memory.

Book of study :

1. B Ram -Fundamentals of microprocessors and microcontrollers, Seventh revised edition, Dhanpat Rai Publications.
2. Manahar Lotia and Pradeep Nair- All about motherboard, First edition, 2005, BPB Publications..
3. Manahar Lotia and Pradeep Nair- Modern all about Hard Disk Drive , First edition, BPB publications.

References:

1. Scott Mueller - Upgrading and repairing PCs , 18th Edition, Pearson.
2. R S. Gaonkar- Micro processor Architecture, Programming and applications with 8085, Sixth Edition, PENRAM International Publishing.



CA3CRT08 - Operating Systems (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Introduction: OS Definition, Functions, Evolution of OS, OS Structure Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

Unit 2: (14 hrs.)

Process: Basic Concepts, Process Scheduling, Operations on Processes, Inter process communication, Process Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

Unit 3: (18 hrs.)

Process Coordination: Synchronization - The Critical Section problem, Semaphores, Classic Problems of Synchronization, Monitors. Deadlocks: System Model, Deadlock Characterization, Methods of handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit 4: (16 hrs.)

Memory Management: Memory Management Strategies - Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management- Demand paging, Page Replacement.

Unit 5: (14 hrs.)

Storage Management: File System: - File Concept, Access Methods, Directory structure. Implementing File Systems:-File System Structure, Allocation Methods, Free Space Management, Disk Scheduling.

Book of study:

1. Abraham Silberschatz, Peter Galvin and Greg Gagne - Operating System Principles, Seventh Edition, John Wiley
2. William Stallings - Operating Systems, Sixth Edition, Prentice Hall of India, Pearson

Reference:

1. Milan Kovic - Operating Systems, 2nd Edition, (TMH)



CA3CRT09 - Data Structures using C++

Theory:4 hrs. per week

Credits:3

Unit 1 (12 hrs.)

Concept of Structured data - Data structure definition, Different types and classification of data structures, Arrays – Memory allocation and implementation of arrays in memory, array operations, Applications - sparse matrix representation and operations, polynomials representation and addition, Concept of search and sort – linear search, binary search, selection sort, insertion sort, quick sort.

Unit 2 (12 hrs.)

Stacks – Concepts, organization and operations on stacks using arrays (static), examples, Applications - Conversion of infix to postfix and infix to prefix, postfix evaluation, subprogram calls and execution, Multiple stacks representation.

Queues - Concepts, organization and operations on queues, examples.

Circular queue – limitations of linear queue, organization and operations on circular queue. Double ended queue, Priority queue.

Unit 3 (18 hrs.)

Linked list: Concept of dynamic data structures, linked list, types of linked list, linked list using pointers, insertion and deletion examples, circular linked list, doubly linked lists

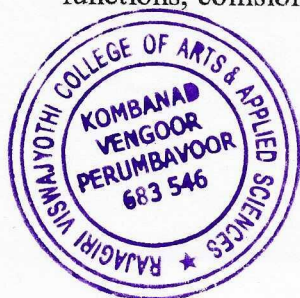
Applications- linked stacks and queues, memory management basic concepts, garbage collection.

Unit 4 (15)

Trees - Concept of recursion, trees, tree terminology, binary trees, representation of binary trees, strictly binary trees, complete binary tree, extended binary trees, creation and operations on binary tree, binary search trees, Creation of binary search tree, tree traversing methods – examples, binary tree representation of expressions.

Unit 5 (15)

File - Definition, Operations on file (sequential), File organizations - sequential, Indexed sequential, random files, linked organization, inverted files, cellular partitioning, hashing – hash tables, hashing functions, collisions, collision resolving methods.



Books of study :

1. G.S Baluja - Data Structures Through C++ (A Practical Approach), Second Edition-2004, Danapat Rai & Co.
2. Ellis Horowitz and Sartaj Sahni - Fundamentals of Data Structures in C++ , Second Edition, Galgotia Publications.

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaums Outline Series,2006, McGraw Hill
2. Yedidyah Lannsam, Moshe Augustein, Aaron M Tenenbaum- Data structures using C and C++ , Second Edition, Prentice Hall

CA3CRP03-Software Lab III (Core)

Software Lab: 6 hrs. per week

Credits:2

Syllabus

Module I

Array – Insertion , Deletion, Polynomial addition using arrays

Sort – Selection, Insertion, Quick

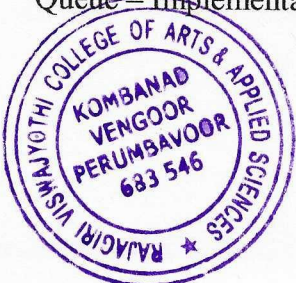
Search – Linear search, Binary search

Sparse matrix – Sparse form representation, transpose and addition using the sparse form

Module II

Stack - Implementation using arrays (linear stack), Infix to postfix conversion, Postfix evaluation

Queue – Implementation using arrays (linear queue), Implementation of circular queue



Module III

Singly linked list – Implementation using dynamic memory allocation techniques, arrange the list based on the ascending or descending order of the information field, concatenate two linked lists, interchange any two nodes in a list, Implementation of circular list, Implementation of linked stacks and queues.

Doubly linked list – Implementation of doubly linked list, Implementation of circular doubly linked list.

Module IV

Creation of binary search trees, Insertion and deletion of nodes, Tree traversals.

Scheme of Evaluation for software lab III external is as follows:

(There will be two questions)

Division of Marks (Practical - 3 hours External)

First program - questions from module 1 & II	- 25 marks
1. Logic	- 10 marks
2. Successful compilation	- 8 marks
3. Result	- 7 marks
Second program – questions from module III & IV	- 35 marks
1. Logic	- 20 marks
2. Successful compilation	- 10 marks
3. Result	- 5 marks
Viva Voce	- 10 marks
Lab Record	- 10 marks
(Minimum of 25 Programs)	
Total Marks	- 80 marks



BCA - SEMESTER IV

CA4CRT10 - Design and Analysis of Algorithms (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

Introduction, Definition of Algorithm, Algorithm design techniques, Algorithm Analysis, performance analysis - space complexity, time complexity, Best, Worst, And average case complexity.

Unit 2 (14 hrs.)

Divide and Conquer General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Strassen's matrix multiplication.

Unit 3 (18 hrs.)

Greedy Algorithm General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Knapsack problem, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm).

Unit 4: (16 hrs.)

Dynamic programming The general method, multistage graphs, all-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem.

Unit 5: (12 hrs)

Basic traversal and search techniques - BFS and traversal, DFS and traversal, Bi-connected components and DFS, Backtracking General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

Book of study:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekharan, Computer algorithms/C++, Second Edition, Universities Press.

References:

1. Anany Levitin- Introduction to design and analysis of algorithms, Third Edition, Addison Wesley Low price edition.
2. Richard Neapolitan & Kumarss Naimipour, Foundation of Algorithms using C++ Pseudocode, Third edition, Jones And Bartlett Publishers.



CA4CRT11 - System Analysis & Software Engineering (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

Information systems concepts, Business information systems; Describing the business organization – organization chart , organization function list ; information system levels - operational, lower, middle, top management; SDLC Life cycle activities- life cycle flow chart, task, management review, baseline specifications, role of system analyst.

Unit 2: (14 hrs.)

Introduction to Software Engineering - Definition, Program Vs Software, and Software process, Software Characteristics, Brief introduction about product and process, Software process and product matrices. Software life cycle models , Definition, Waterfall model, Increment process models- Iterative , RAD , Evolutionary process models-Prototyping ,Spiral. Selection of a life cycle model.

Unit 3: (18 hrs.)

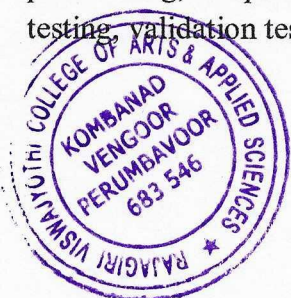
Software Requirement Analysis and Specification Requirements Engineering type of requirements, Feasibility Studies, Requirement Elicitation – Use Case, DFD, Data Dictionaries , Various steps for requirement analysis, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO).

Unit 4: (14 hrs.)

Software Design - Definition, Various types, Objectives and importance of Design phase, Modularity, Strategy of design, Function oriented design, IEEE recommended practice for software design descriptions. Steps to Analyze and Design Objected Oriented System. Software Reliability Definition, McCall software quality model, Capability Maturity Model.

Unit 5: (14 hrs.)

Software Testing : What is testing?, Test, Test case and Test Suit, Verification and Validation, Alpha, beta and acceptance testing, functional testing, techniques to design test cases, boundary value analysis, Equivalence class testing, decision table based testing, cause effect graphing technique, Structural testing path testing, Graph matrices, Data flow testing; Levels of testing Unit testing, integration testing, system testing, validation testing,



Book of Study:

1. Marvin Gore & John Stubbe -Elements Of System Analysis, Fourth Edition, Galgotia Book Source.
2. K K Aggarwal, Yogesh Singh - Software Engineering, Third Edition, New Age International Publications.

References :

1. Roger S Pressman - Software Engineering: A Practitioner's Approach, Sixth Edition, McGraw-Hill Higher Education.
2. Ian Sommerville - Software Engineering , Seventh Edition, Pearson Education.
3. Pankaj Jalote - An Integrated approach to Software Engineering, Second Edition, Narosa Publishing Company.

CA4CRT12 - Linux Administration (Core)

Theory:4 hrs. per week

Credits:4

Unit-1 (12 hrs.)

Overview of Linux : What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons.

Unit 2 (15 hrs.)

Essential Linux commands: Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, process scheduling – (at, batch), nohup command, kill, ps, who, find, sort, touch, file, file processing commands - wc, cut, paste etc Mathematical commands - expr, factor etc. Creating and editing files with vi editor.

Unit 3 (15 hrs.)

Shell programming - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash. Conditional and looping statements, case



statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit-4 (18 hrs.)

System administration - Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command.

Unit-5: (12 hrs.)

Simple filter commands: pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed **Understanding various Servers :**DHCP, DNS, Squid, Apache, Telnet, FTP,Samba.

Book of study :

1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.

References :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
2. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.
3. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.



CA4CRT13 -Web Programming Using PHP

Theory:3 hrs. per week

Credits:3

Unit 1 (8 hrs.)

Introduction to web, WWW architecture, Fundamentals of HTML, text formatting tags, marquee, inserting images, links, lists, creating tables, frames, working with form elements.

Unit 2 (10 hrs.)

CSS introduction, <link> and <style> elements, CSS properties, Controlling Fonts, Text formatting, Text- pseudo classes, Selectors, Links, Backgrounds, lists

Introduction to Java Script, Java Script variables, operators, decision control statements, looping, functions, arrays, events, popup boxes-alert, prompt, conform box, built-in objects, writing JavaScript, form validation

Unit 3 (10 hrs.)

Introduction to PHP, server side scripting, role of web server software, php comments, variables, echo and print, PHP operators, data types, branching statements, loops, arrays

Unit 4 (12 hrs.)

PHP functions, PHP form, Passing information between pages, \$_GET, \$_POST, \$_REQUEST. String functions, include and require, session and cookie management, error handling in PHP, Object Oriented Programming using PHP

Unit 5 (14 hrs.)

Introduction to MySQL, datatypes, SQL commands-CREATE, UPDATE, INSERT, DELETE, SELECT, PHP functions for MySQL connectivity and operation- mysql_connect, mysql_select_db, mysql_query, mysql_fetch_row, mysql_fetch_array, mysql_result, mysql_list_fields, mysql_num_fields, insertion, updation and deletion of data using PHP, displaying data from MySQL in webpage.

Book of Study:

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi - "Beginning PHP", Wiley Publishing, Inc
2. Ivan Bayross - "HTML, DHTML, JavaScript, Pearl & CGI ", Fourth Revised Edition, BPB Publication.
3. "Programming PHP",Rasmus Lerdorf and Kevin Tatore, Shroff Publishers & Distributors Pvt. Ltd
4. "Beginning PHP", Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi, Wiley Publishing, Inc



CA4CRP04 - Software Lab IV (Core)

Software Lab: 6 hrs. per week

Credits:2

I. Linux (2 hrs. per week)

Sl.No	Topic and Details
1	Getting started –Commands
2	The Linux Architecture and command usage – Commands, General-purpose utilities
3	The File system –Commands
4	Process related commands
5	Handling ordinary files, Basic file attributes
6	The vi editor
7	Simple Filters, Filters using regular expressions-use of grep command
8	Introduction to shell concept and writing shell script
9	Introduction to shell concept and writing shell script, Essential Shell Programming
10	User management, monitoring system performance, disk usage etc.

II. Web Programming using PHP (4 hrs. per week)

1. Creating programs based on HTML
2. Creating Java script based programs
3. Creating simple programs based on PHP
4. Programs using PHP functions
5. Programs based on MY SQL

Scheme of Evaluation for software lab IV external is as follows:



(There will be two questions; the first from LINUX and second from PHP)

Division of Marks (Practical - 3 hours External)

First program - questions from LINUX

- 25 marks

1. Logic – 10 marks
2. Successful compilation – 8 marks
3. Result – 7 marks

Second program – questions from PHP

- 35 marks

1. Logic – 15 marks
2. Successful compilation – 15 marks
3. Result – 5 marks

Viva Voce

- 10 marks

Lab Record

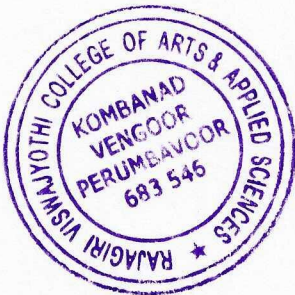
- 10 marks

(LINUX -Minimum of 10 Programs

PHP -Minimum of 15 Programs)

Total Marks

- 80 marks



BCA - SEMESTER V

CA5CRT14 : Computer Networks (Core)

Theory:3 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Introduction to Networks, Data and signals-analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth. Transmission impairments- attenuation, distortion and noise.

Data communication protocols and standards, Network models - OSI model-layers and their functions. TCP/IP protocol suite.

Unit 2: (10 hrs.)

Bandwidth utilization Multiplexing: FDM, TDM, spread spectrum.

Transmission Media- guided media and unguided media.

Switching: message, Circuit and packet switched networks, datagram networks, virtual- circuit networks.

Unit 3: (12 hrs.)

Data link layer: Error Detection and Correction, Framing, flow and error control, Protocols - Noiseless channels (Simplest, Stop and Wait) and Noisy channels (Stop and Wait and Piggy Backing).

Multiple Access Protocols. Random Access-ALOHA, CSMA. Wired LANs-IEEE standards, wireless LANs-Bluetooth, Cellular Telephony

Unit 4: (12 hrs.)

Network layer and Transport layer: Repeaters, Bridges, Gateways and routers. Logical addressing – IPV4 and IPV6 addressing, Internet protocol - IPV4 and IPV6. Connectionless and Connection Oriented Services: UDP and TCP. Congestion Control, Quality of Service.

Unit 5: (10 hrs.)

Application layer: HTTP, FTP, SMTP, DNS. Network security: Common Threats- Firewalls (advantages and disadvantages), Cryptography.

Book of study:

1. B. A. Forouzan - Data communication and Networking, Fourth edition-,TMH
2. Andrew S Tanenbaum - Computer Networks ,Fourth Edition, Prentice Hall of India.



CA5CRT15 - IT & Environment (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 : (18 hrs.)

Multidisciplinary nature of environmental studies : Definition, scope and importance, Need for public awareness. (2 hrs)

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) **Forest resources:** Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) **Water resources:** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) **Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) **Energy resources:** Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies. f) **Land resources:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of individual in conservation of natural resources. Equitable use of resources for sustainable life styles. (10hrs)

Ecosystems : Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids., Introduction, types, characteristic features, structure and function of the given ecosystem:- Forest ecosystem

(6 hrs)

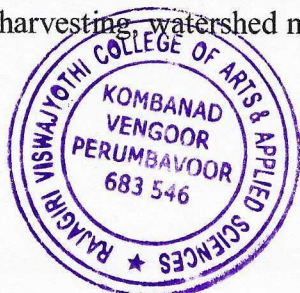
Unit 2: (26 hrs)

Biodiversity and its conservation: Introduction, Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values., India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

(8 hrs)

Environmental Pollution :Definition, Causes, effects and control measures of: - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management: Causes, effects and control measures of urban and industrial wastes., Role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides. (8 hrs)

Social Issues and the Environment :Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: its problems and concerns,



Case studies, Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion , nuclear accidents and holocaust, Case studies, Consumerism and waste products, Environment Protection Act , Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness. (10hrs)

Unit 3: (10 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET . (10hrs)

Unit 4: (10 hrs.)

IT & Society- issues and concerns- digital divide, IT & development, the free software movement , IT industry: new opportunities and new threats, software piracy, cyber ethics, cyber crime, cyber threats, cyber security, privacy issues, cyber laws, cyber addictions, information overload, health issues- guide lines for proper usage of computers, internet and mobile phones. e-wastes and green computing, impact of IT on language & culture-localization issues- Unicode- IT and regional languages, Green Computing Concept. (10hrs)

Unit 5: (8 hrs.)

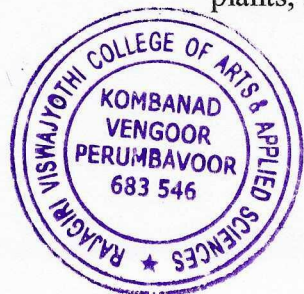
Human Rights– An Introduction to Human Rights, Meaning, concept and development, Three Generations of Human Rights (Civil and Political Rights; Economic, Social and Cultural Rights).

Human Rights and United Nations – contributions, main human rights related organs - UNESCO, UNICEF, WHO, ILO, Declarations for women and children, Universal Declaration of Human Rights. **Human Rights in India** – Fundamental rights and Indian Constitution, Rights for children and women, Scheduled Castes, Scheduled Tribes, Other Backward Castes and Minorities

Environment and Human Rights - Right to Clean Environment and Public Safety: Issues of Industrial Pollution, Prevention, Rehabilitation and Safety Aspect of New Technologies such as Chemical and Nuclear Technologies, Issues of Waste Disposal, Protection of Environment **Conservation of natural resources and human rights:** Reports, Case studies and policy formulation. Conservation issues of western ghats- mention Gadgil committee report, Kasthuriengan report. Over exploitation of ground water resources, marine fisheries, sand mining etc. (8 Hrs)

Internal: Field study

- Visit to a local area to document environmental grassland/ hill /mountain
- Visit a local polluted site – Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds etc

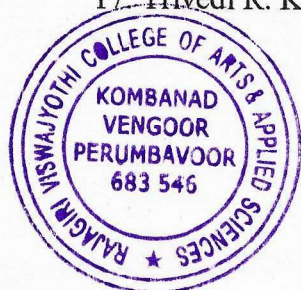


- Study of simple ecosystem-pond, river, hill slopes, etc

(Field work Equal to 5 lecture hours)

References:

1. "Technology in Action" Alan Evans, Kendall Martin, Mary Anne Poatsy, Pearson
2. Bharucha Erach, Text Book of Environmental Studies for undergraduate Courses. University Press, IInd Edition 2013 (TB)
3. Clark.R.S., Marine Pollution, Clarendon Press Oxford (Ref)
4. Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T.2001 Environmental Encyclopedia, Jaico Publ. House. Mumbai. 1196p .(Ref)
5. De A.K.Environmental Chemistry, Wiley Eastern Ltd.(Ref)
6. Down to Earth, Centre for Science and Environment (Ref)
7. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment, Cambridge University Press 1140pb (Ref)
8. Jadhav.H & Bhosale.V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p (Ref)
9. Mckinney, M.L & Schock.R.M. 1996 Environmental Science Systems & Solutions. Web enhanced edition 639p (Ref)
10. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
11. Odum.E.P 1971. Fundamentals of Ecology. W.B. Saunders Co. USA 574p (Ref)
12. Rao.M.N & Datta.A.K. 1987 Waste Water treatment Oxford & IBII Publication Co.Pvt.Ltd.345p (Ref)
13. Rajagopalan. R, Environmental Studies from crisis and cure, Oxford University Press, Published: 2016 (TB)
14. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut (Ref)
15. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (Ref)
16. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (Ref)
17. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (Ref)



18. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p
(Ref)
19. M-Magazine, R-Reference TB- Text Book

CA5CRT16 – Java Programming using Linux (Core)

Theory:3 hrs. per week

Credits:3

UNIT 1 (10 hrs.)

Concepts of Object oriented programming, Benefits of OOP, Features of java. Java environment, java tokens, Constant, variables, data types, operators, Control Statements-branching statements, looping statements, jump statements, labeled loops.

UNIT 2 (10 hrs.)

Defining a Class, Fields declaration, Method declaration, Creating object, Accessing class members, method overloading, Constructors, constructor overloading, super keyword, static Members, Inheritance, overriding methods, dynamic method dispatch, final(variables, methods and classes), abstract methods and classes, interfaces, visibility control.

UNIT 3 (12 hrs.)

Arrays- One dimensional arrays, declaration, creation, initialization of arrays, two dimensional arrays, String class. Packages: - java API packages overview (lang, util, io, awt, swing, applet), user defined packages-creating packages, using packages

Exception Handling Techniques-try-catch-throw-throws-finally -Multithreading- creation of multithreaded program-Thread class-Runnable interface, Thread life cycle.

UNIT 4 (10 hrs.)

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- Event classes- Swing- architecture, components of swing- JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JTextField, JText Area, JPanel, JFrame, Layout Managers(Flow Layout, Grid Layout, Card Layout, Border Layout, Box Layout, Null Layout).

UNIT 5 (10 hrs.)



Applet Fundamentals -applet tag, applet life cycle, passing parameters to applets. Working with graphics -Line, Rectangle, Oval, Arc, color setting. JDBC architecture- JDBC connection, JDBC statement object, JDBC drivers.

Book of study :

1. E. Balagurusamy- Programming with Java , Third Edition, McGraw Hill Companies.
2. K. Somasundaram - PROGRAMMING IN JAVA2, First Edition, Jaico Publishing House.

Reference:

1. Patrick Naughton - Java2 The Complete Reference, Seventh Edition:
2. Cay S Horstmann & Gary Cornell - Core Java Volume 1- Fundamentals, Eighth edition.
3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

CA5CRP05 : Software Lab V (core)

Software Lab: 5 hrs. per week

Credits: 2

Syllabus

Part I. Applet, JDBC connection and swing based Programs

Part II (using class and read inputs from keyboard)

Java Programs: Method Overloading- Method Overriding-inheritance-abstract class, interfaces- packages- Exception Handling-Multithreading

Scheme of Evaluation for software lab V external is as follows:

(There will be two questions; the first from Part I and second from Part II)

Division of Marks (Practical - 3 hours External)

First program - questions from Part I	- 25 marks
1. Logic	– 10 marks
2. Successful compilation	– 8 marks
3. Result	– 7 marks
Second program – questions from Part II	- 35 marks



1. Logic – 20 marks
2. Successful compilation – 10 marks
3. Result – 5 marks

Viva Voce - 10 marks

Lab Record - 10 marks

(Minimum of 25 Programs)

Total Marks - 80 marks

CA5CRP06 : Software Development Lab I (core)

Software Development Lab: 6 hrs. per week

Credits: 2

Mini project can be a small complete application project, to make the student confident in designing a system based on Software engineering course. The internal and external evaluation is to be done with the project demonstration and presentation, viva and modification. It must be done in the college lab under the guidance of a faculty.

Scheme of Evaluation for Software Development Lab I external is as follows:

Division of Marks (Software Development Lab I)

Project demonstration and Presentation - 25 marks

Modification - 15 marks

Viva Voce - 15 marks

Project report with proper content and binding - 25 marks

Total Marks - 80 marks

OPEN COURSES



CA5OPT01 -Informatics and Cyber Ethics

Theory:4 hrs. per week, Credits:4

Unit I (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic mail.

Unit II (16 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services-INFLIBNET, NPTEL, NICNET, BRNET.

Unit III (16 hrs.)

Introduction to purchase of technology, License, Guarantee, Warranty, Basic concepts of IPR, copyrights and patents, plagiarism. IT & development, the free software movement

Unit IV (14 hrs.)

Cyber space, information overload, cyber ethics, cyber addictions, cybercrimes- categories -person, property, Government-types-stalking, harassment, threats, security & privacy issues.

Unit V(14 hrs.)

Cyber Addiction, Information Overload, Health Issues, e-Waste and Green computing impact of IT on language & culture-localization issues- Unicode- IT and regional languages e-Governance in India, IT for National Integration, Role of IT.

Book of Study:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy - "Technology in Action", Pearson

References:

1. Dinesh Maidasani "Learning Computer Fundamentals, MS Office and Internet & Web Technology", Firewall Media, Lakshmi Publications.
2. V Rajaraman - "Introduction to Information Technology", Prentice- Hall of India.
3. Barkhs and U. Rama Mohan - HTML Black Book 3. "Cyber Law Crimes", Asia Law House, New Edition
4. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

CA5OPT02 Computer Fundamentals, Internet & MS Office



Theory:4 hrs. per week

Credits:4

Unit I (12 hrs.)

Computer Fundamentals: History, Generations, Classifications, Operating Systems, Types of Networks

Unit II (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic Email

Unit III (14 hrs.)

Word processing: Introduction, Microsoft Word, Basic Menus, Formatting the text & paragraph, Working with Index

Unit IV (18 hrs.)

Spread Sheet: Introduction, Microsoft Excel, Basic Menus, Formulas, Basic functions, Charts and Graphs.

Unit V (16 hrs.)

Microsoft PowerPoint: Introduction, Basic Menus, Template, Slide Basics, Charts, Adding Multimedia & Animation.

Book of Study:

1. Dinesh Maidasani, Firewall Media - "Learning Computer Fundamentals, MS Office and Internet & WebTechnology", , Lakshmi Publications.

References:

1. Harley Hahn - "Internet Complete Reference", , Second Edition, Tata McGraw Hill Education
2. Gary B. Shelly, Misty E. Vermaat - "Microsoft Office 2010: Advanced" , CENGAGE Learning 2010



BCA - SEMESTER VI

CA6CRT17 - CLOUD COMPUTING (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (14 hrs.)

Introduction: Cloud Computing at a Glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies, Principles of Parallel and Distributed Computing: Eras of Computing, Parallel vs. Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing.

Unit 2: (14 hrs.)

Virtualization: Introduction, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

Unit 3: (14 hrs.)

Cloud Computing Architecture :Introduction, Cloud Reference Model, Types of Clouds, Economics of the Cloud, Open Challenges.

Unit 4: (16 hrs.)

Aneka: Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud Programming and Management, Data Intensive Computing: Map-Reduce Programming - What is Data-Intensive Computing?, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

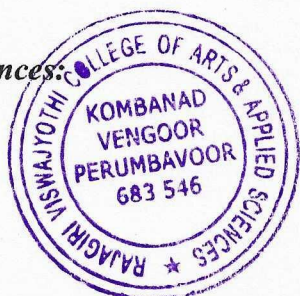
Unit 5: (16 hrs.)

Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, Microsoft Azure, Cloud Applications: Scientific Applications, Business and Consumer Applications.

Book of Study:

1. Rajkumar Buyya, Christian Vecchiola, S ThamaraiSelvi- Mastering Cloud Computing, Tata McGraw Hill Publications.

References:



1. Kumar Saurabha, "Cloud Computing " Wiley Publication Krutz ,Vines "Cloud Security".
Wiley Publication.
2. A Srinivasan & J. Suresh " Cloud Computing : A Practical Approach for learning and
Implementation " , First edition ,Pearson

CA6CRT18 -Mobile Application Development – Android (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 (10 hrs.)

Introduction to Android, Android Versions, Android Activity, Android Features and Architecture, Java JDK, Android SDK, Android Development Tools, Android Virtual Devices,

Emulators, Dalvik Virtual Machine, Layouts – Linear, Absolute, Frame, Relative and Table.

Unit 2 (16 hrs.)

Android User Interface- Fundamental UI design , User interface with View- Text View, Buttons, Image Button, Edit Text, Check Box, Toggle Button, Radio Button and Radio Group, Progress Bar, Autocomplete Text View, Spinner, List View, Grid View, Image View, Scroll View, Custom Toast Alert and Time and Date Picker.

Unit 3 (14 hrs.)

Activity - Introduction, Intent, Intent_filter, Activity Life Cycle, Broadcast Life Cycle, Services, multimedia-Android System Architecture, Play Audio and Video, Text to Speech.

Unit 4 (16 hrs.)

SQLite Database in Android- Introduction to SQLite Database, Creation and Connection of the

Database, Extracting values from Cursors, Transactions, Telephoning and Messaging-SMS Telephony, Sending SMS, Receiving SMS, Wi-Fi Activity.

Unit 5 (16 hrs.)



Introduction to JSON and XML, Use of JSON, Syntax and Rule of JSON, JSON Name, JSON Values, JSON Objects, JSON Arrays, Parsing JSON and XML.

Google Play services, Location services, Maps

Book of Study:

1. Prasanna Kumar Dixit - ANDROID, Vikas Publishing House.
2. Anubhav Pradhan, Anil Deshpande, Composing Mobile Apps using Android, Wiley India Pvt.Ltd,2014

References:

1. Kevin Grant and Chris Haseman, Beginning Android Programming – Develop and Design, Pearson.

Software Lab Work (Four hours per week)

Module II

Installation and configuration of Eclipse and Development Tools

Module III

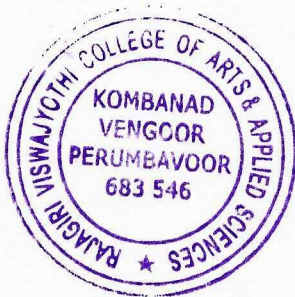
Creating simple apps using Interface Tools

Module IV

Creating Andoid Apps using SQLite

Module V

Familiarizing with JSON and XML, Creation and distribution of Android Apps.



Elective papers (core)

CA6ELT01- DATA MINING (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

Introduction Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

Unit 2: (12 hrs.)

Data Warehouse and OLAP technology Data Warehouse, Multidimensional data Model, Data warehouse architecture, Data Warehouse implementation, OLAP, Data Warehouse and data mining.

Unit 3: (18 hrs.)

Association Rules and Classification Concepts Efficient and Scalable Frequent item set Mining methods, Mining various kind of association rules, from association mining to Co-relation analysis, Classification and prediction, Issues, Classification by Decision tree induction, Bayesian Classification, Rule-based classification, Support Vector Machines, Learning from your neighbors, Prediction.

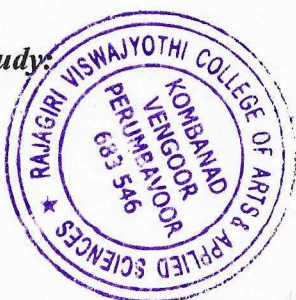
Unit 4: (18 hrs.)

Cluster Analysis Definition, Types of data in cluster analysis, A categorization major Clustering methods- Partitioning methods, K-means and k-medoids, from k-medoids to CLARANS, Hierarchical methods, Density based methods.

Unit 5: (12 hrs.)

Mining Complex Data Spatial Data Mining, Multimedia Data Mining, Text Mining and Mining WWW.

Book of study:



1. Jiawei Han and Micheline Kamber - Data Mining - Concepts and Techniques, Second Edition, Elsevier, 2006

Reference:

1. Witten and Frank - Data Mining Practical Machine Learning Tools and Techniques, Second Edition, Elsevier, 2005
2. Soman, Divakar and Ajay, Data Mining Theory and Practice, PHI, 2006
3. Margaret H Dunham- Data Mining –Introductory and Advanced Topics, Fourth Edition, Person 2006

CA6ELT02 -Digital Image Processing

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Digital Image Fundamentals

Image, Digital Image, Digital image processing-definitions, Examples of fields that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Image processing system.

Unit 2 : (14 hrs.)

Elements of visual perception

Elements of visual perception- Image Formation, Brightness adaptation and Discrimination, Image sampling and quantization- basic concepts, spatial and Intensity resolution, Basic relationship among Pixels.

Unit 3: (16 hrs.)

Image Enhancement in Spatial and Frequency Domain

Intensity Transformation and spatial Filtering Basics, Intensity transformation functions- Image Negatives, Log Transformations, Power Law Transformations, Histogram Processing, Spatial filtering- correlation and convolution; Fourier transform and frequency domain.

Unit 4: (15 hrs.)



Morphological Image Processing

Introduction, basis of set theory, Dilation, Erosion, Structuring elements, Opening and Closing, Hit or miss transformation.

Unit 5: (17 hrs.)

Image Segmentation

Point, Line, Edge detection-detection of isolated points, Basic edge detection- Gradient operators; Pixel based approach-Basics of intensity thresholding, Basic global thresholding; Region based segmentation-region growing, region splitting and merging.

Book of Study:

1. Rafael C. Gonzalez, Richard E. Woods- Digital Image Processing, Third Edition, Pearson.

References:

1. Anil K Jain- Fundamentals of Digital Image Processing , Pearson Education.
2. Er. Rishabh Anand, Digital Image Processing, MEDTEC Publications.

CA6ELT03- Soft Computing Techniques

Theory:4 hrs. per week

Credits:4

Unit 1 (14 hrs.)

Soft Computing, Difference between soft computing and hard computing. **Neural Networks:** Basic concepts of Neural Networks, Human Brain, Artificial Neuron model, Activation functions, Neural network architecture, Single layer and multilayer feedforward networks, Recurrent networks, Neural network characteristics, Learning methods, Rosenblatt's perceptron, Perceptron and linearly separable tasks, XOR problem, Neural network applications.

Unit 4: (15 hrs.)



Back Propagation Networks: Architecture- perceptron model, solution, single layer artificial neural network, multilayer perception model, back propagation learning- input layer computation, hidden layer computation, output layer computation, calculation of error, Training of neural network, effect of learning rate coefficient, Back propagation algorithm.

Unit 3: (15 hrs.)

Fuzzy Set Theory: Fuzzy versus crisp, Crisp sets, Operations on crisp sets, Properties of crisp sets, Partition and covering, Fuzzy sets, Membership functions, Basic fuzzy set operations, Properties of fuzzy sets, Crisp relations, Operations on crisp relations, Fuzzy relations, Fuzzy cartesian product, Operations on fuzzy relations.

Unit 4 : (15 hrs.)

Fuzzy Systems: Crisp logic, Laws of propositional logic, Inference in propositional logic, Predicate logic, Interpretations of predicate logic formula, Inference in predicate logic, Fuzzy logic, Fuzzy propositions, Fuzzy connectives, Fuzzy quantifiers, Fuzzy inference, Fuzzy rule based system, Defuzzification methods, Applications.

Unit 5: (14 hrs.)

Genetic Algorithm: History, Basic concepts, Biological background, Creation of offsprings, Encoding, Fitness function, Reproduction, **Genetic Modeling:** Crossover, Inversion and deletion, Mutation, Bit-wise operators used in geneticalgorithm, Generational cycle, Convergence of a genetic algorithm, Issues and benefits of GA, Application domains.

Book of study:

1. S. Rajasekaran and G.A VijayalakshmiPai- Neural Networks, Fuzzy Logic, and Genetic Algorithms Synthesis and Applications, Prentice-Hall of India Pvt.Ltd ,2004.

References:

1. S. N. Sivanandan and S. N. Deepa, Principles of Soft Computing, Wiley India 2nd Ed, 2011.
2. B K Tripathy, J. Anuradha, Soft computing Advances and Applications, Cengage Learning.
3. B Yegnanarayana, Prentice, Artificial Neural Network, Hall of India Pvt.Ltd ,2012.



CA6CRP07 : Seminar (core)

Seminar Presentation: 2 hrs. per week

Credits: 2

Each student can choose a latest topic of current day interest in the areas of Computer Science / Information Technology and present a seminar presentation using appropriate presentation media. A seminar presentation report in bound form in the pattern of a complete technical report (with contents page, well structured presentation, references etc.) should be submitted. There will not be any external evaluation for Seminar Presentation.

Scheme of Evaluation of Seminar Presentation (core) for INTERNAL is as follows:

Division of Marks

Seminar Presentation Internal (100 marks)

Presentation	- 40 marks
Discussion(Questions and Answers)	- 30 marks
Documentation	10 marks
Seminar report with proper Content and Binding	- 20 marks
Total Marks	-100 marks

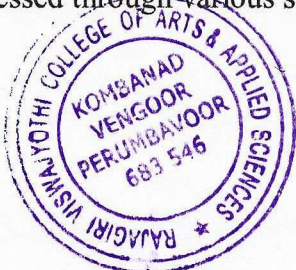
CA6CRP08 : Software Development Lab II (Main Project) (Core)

Software development lab: 7 hrs. per week

Credits: 3

Individual project.

The project topic shall be chosen from areas of current day interest using latest packages / languages running on appropriate platforms (Except the tools used in software development-I), so that the student can be trained to meet the requirements of the Industry. A project report should be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals.



Scheme of Evaluation for Software Development Lab II external is as follows:

Division of Marks (Software Development Lab II)

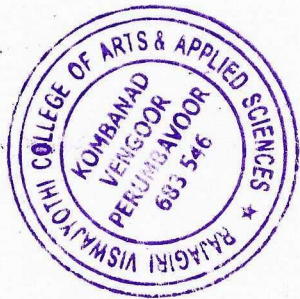
Project demonstration and Presentation	- 40 marks
Viva related to project	- 20 marks
Project report with proper content and binding	-20 marks
Total Marks	- 80marks

CA6VVT01 –VIVA VOCE (Core)

Credit :1

Scheme of Evaluation of Viva voce (core) for External is as follows:

Each student should attend a course viva voce based on syllabus from semester I to semester IV.



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PRINCIPAL
Rajagiri Viswajyothi College of
Arts & Applied Sciences
Vengoor, Perumbavoor-683 546