

P.R. GOVT. COLLEGE (A)

KAKINADA

Affiliated to Adikavi Nannaya University

Rajamahendravaram



DEPARTMENT OF COMPUTER SCIENCE

CBCS (CLUSTER PATTERN)

BOARD OF STUDIES

2021-2022

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
BOARD OF STUDIES 2020-2021

The eightteenth meeting of Board of Studies *COMPUTER SCIENCE* has been conducted in the Department of Computer Science on 17 NOV, 2021 to discuss the following.

AGENDA

1. Department activities for 2021-22 academic year.
2. Organizing National/State level Seminars / Workshops / Conferences / Training programmes etc., with topics and other details
3. Plan for utilization of funds for Autonomous/CPE/other grants available for arranging guest lecturers, faculty improvement programmes, study tours, equipping laboratories, reference books & other necessary teaching-learning material.
4. Plan for organizing subject oriented community outreach programmes & allocation of necessary funds.
5. Institution of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc.,
6. Any other programme that enhances the learning capacity of students and their employable & knowledge skills.
7. Suggest panel of examiners / paper setters & other experts / nominees for BOS deliberations.
8. Pedagogy implementation w.e.f admitted batch 2021-22.
9. Internal Assessment weightage 40% for II Year and III Year students and 50% for I Year students
10. End Semester Examinations 2hrs .30 min and for 60 Marks, for II and III Year students , 2hrs 30mins for 50 marks for I Year students.
11. Conduct practical examination semester wise for three years.
12. Encourage students to take up certified courses from IIT Bombay Spoken Tutorial and Cisco courses
13. IOT syllabus for I and II year students may be followed as framed

RESOLUTIONS

- 1) The eighteenth meeting of Board of Studies **COMPUTER SCIENCE** has been conducted in the Department of Computer Science on __17__Nov, 2021 discuss the following.
- 2) Department action plan 2021-22 submitted in annexure.
- 3) Pedagogy implementation w.e.f admitted batch 2020-21.
- 4) Resolved to approve panel of names for appointment of examiners/ paper setters annexed to these resolutions.
- 5) Resolved to conduct End Semester Examinations 2hrs .30 min and for 60 Marks, and Mid Semester Examinations 1 hr 15 min for 40 marks for II and III year students,
- 6) Resolved to conduct End Semester Examinations 2hrs .30 min and for 50 Marks, and Mid Semester Examinations 1 hr for 25 marks for I year students
- 7) Resolved to conduct practical examination semester wise for all Three years
- 8) Resolved to encourage students to take up certified courses from IIT Bombay Spoken Tutorial and Cisco courses
- 9) Resolved to Follow IOT syllabus I and II Years as framed

MEMBERS PRESENT

- 1 Mr. G.B.V.Padmanadh
Lecturer In-charge (Computers Science)
P. R. Govt College (A)
Kakinada
Chair man
- 2 Smt .N.Naga Subrahmanyesweri
Lecturer In Computer Science
AS D Women's College
Kakinada
University Nominee
- 3 Dr N Sridhar
Lecturer In Computer Science
GDC Tuni
Subject Expert
- 4 Smt. G Satya Suneetha
Lecturer in Computer Applications
ASD Women's College
Kakinada
Subject Expert
- 5 Dr N Srinivas
Lecturer in Zoology
P R Govt (A) College
Kakinada
Member

- 6 Mr R V Satyanarayana
Lecturer in Computer Science
P R Govt (A) College
Kakinada
Member
- 7 G. Anitha
Lecturer in Computer Science
P R Govt (A) College
Kakinada
Member
- 8 Mr A Anantha Teja
Lecturer in Computer Science
P R Govt (A) College
Kakinada
Member
- 9 K Manisha
Lecturer in Computer Science
P R Govt (A) College
Kakinada
Member

STUDENT REPRESENTATIVES

1. Gopi sai teja III MECS, 85%
2. G. Nani Babu III M CCS, 80%
3. Naga Raju III MSCS, 80%
4. Sk. Apsana Bhasheer I MECS, 83%
5. P. Tejasri I MEIOT, 84%
6. R. Ganesh I MPCS, 87%

B.Sc. Computer Science

Courses for the Academic Year 2021-2022

B.Sc. PROGRAMME – COURSE STRUCTURE OF COMPUTER SCIENCE UNDER CBCS PATTERN

S.No	Semester	Course Code	Title of the Course (Paper)	Hrs/Week	Max Marks (SEE)	Marks in CIA	total	Credits
1	SEM - I		Problem Solving in C	4	50	50	100	3
			Problem Solving in C Lab	2	0	50	50	2
2	SEM - II		Data Structures using C	4	50	50	100	3
			Data Structures using CLab	2	50	0	50	2
3	SEM- III		Database Management Systems	4	60	40	100	3
			Database Management Systems lab	2	--	50	50	2
4.	SEM IV		Object oriented programming using java	4	60	40	100	3
			Object oriented programming using java lab	2	50	--	50	2
			Operating Systems	4	60	40	100	3
			Operating Systems Lab	2	50		50	2
5	SEM-V		Database Management System	3	60	40	100	3
			DBMS Lab	2	0	50	50	2
6			Software Engineering	3	60	40	100	3
			Software Engineering Lab	2	0	50	50	2
7.	SEM- VI		Elective-A: Web Technologies	3	60	40	100	3
			Web Technologies Lab	2	50	--	50	2
8.	ELECT IVES		Elective B: Computer Networks	3	60	40	100	3
			Computer Networks Lab	2	50	--	50	2
9.			Elective C: Operating System	3	60	40	100	3
			Operating System Lab.	2	50	--	50	2
10.	SEM- VI		Cluster A1: JavaScript	3	60	40	100	3
			JavaScript Lab	2	50	--	50	2

11.	CLUSTERS		Cluster A2: PHP & MYSQL	3	60	40	100	3	
			PHP &MYSQL Lab	2	50	--	50	2	
12.			Cluster A3: Project Work	5	100	50	150	5	
13.			Cluster B1: Foundation of Data Science	3	60	40	100	3	
			Foundation of Data Science LabThrough R	2	50	--	50	2	
14.			Cluster B2: Big Data	3	60	40	100	3	
			Big Data Lab Using Hadoop	2	50	--	50	2	
15.			Cluster B3: Project work	5	100	50	150	5	
16.			Cluster C1: Distributed Systems	3	60	40	100	3	
			Distributed Systems Lab	2	50	--	50	2	
17.			Cluster C2: Cloud Computing	3	60	40	100	3	
			Cloud Computing Lab	2	50	--	50	2	
18.			Cluster C3: Project	5	100	50	150	5	
19		SEM I	Life skills 1	Basics of Computer Applications	2	50		50	2
20		SEM II	Life Skills 2	ICT	2	50		50	2

B.Sc. (IOT)

Courses for the Academic Year 2021-2022
B.Sc. PROGRAMME – COURSE STRUCTURE OF IOT
UNDER CBCS PATTERN

S.No	Semester	Course Code	Title of the Course (Paper)	Hrs/ Week	Max Marks (SEE)	Marks in CIA	total	Credits
1	SEM - I		Fundamentals of Computer and C - Programming	4	50	50	100	3
			Hardware and C Programming Lab	2	0	50	50	2
2	SEM - II		Fundamentals of IoT and Applications	4	50	50	100	3
			Arduino Lab	2	50	0	50	2
3	SEM- III		Data Communications & Computer Networks	4	60	40	100	3
			Wired and Wireless Network Lab	2	--	50	50	2
4.	SEM IV		RFID and Sensor Networks	4	60	40	100	3
			Network Simulator –3 Lab	2	50	--	50	2
			Implementing IoT with Raspberry Pi	4	60	40	100	3
			Raspberry Pi Lab	2	50		50	2

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

BOARD OF STUDIES 2021-2022

Marks Distribution for the II Year & III Year

Internal: 40 marks

External: 60 marks

S.No.	Activities	Marks Allotted
1	Two Internal Mid Term Exams (Avg of two)..for 40 marks scaled down to 20	20 Marks
2	Attendance, seminars, quiz and Student Activities	20 Marks
		Total - 40 Marks

Marks Distribution for the I Year

Internal: 50 marks

External: 50 marks

S.No.	Activities	Marks Allotted
1	Two Internal Mid Term Exams (Avg of two). for 25marks	25 Marks
2	Project/Assignments(10) seminars(5) Viva voce(10)	25 Marks
		Total - 50 Marks

Semester	Title of the Course(Paper)	Changes
SEM-I	Problem Solving in C	Unit II : Removed the GOTO statement Unit IV- Removed Arrays of Unions Variables, Arrays of Structures
	Problem Solving in C – Lab	Removed the Data Structures related programs from here.
SEM-II	Data Structures using C	Unit 1 : Removed the Array Basics in Unit II and Introduced the Operations on Arrays Unit III : Removed the Priority Queues and DeQueues Unit V : Removing the “, Spanning Trees, Shortest Path”
	Data Structures using C – Lab	Changed the questions according to the changes in syllabus.
SEM-III	DATABASE MANAGEMENT SYSTEMS	Unit 1 : Removed Cost of DBMS Unit II : Removed EER Model Unit III : Removed relational calculus Unit V : Removed Operator Precedence
	DATABASE MANAGEMENT SYSTEMS – Lab	Reduced the scope of DML queries
SEM-IV	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA	Unit I : Moved arrays to Unit II Unit II: Moved Inheritance, Polymorphism to Unit III. Unit III : Moved the Abstract classes, Interfaces, exception handling and packages to Unit IV Unit IV: Removed the Deadlocks and Daemon threads concepts. Removed Zip/Unzip, Serialization Concepts, Moved the Threading Concepts to Unit V Unit V: Removed Applets as this is age old concept. Removed JDBC Concepts
SEM IV	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA – Lab	Removed the applet programs
SEM IV	Operating Systems	
SEM IV	Operating Systems - Lab	

PR GOVT COLLEGE (A) :: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
B.Sc. PROGRAMME – COURSE STRUCTURE IN COMPUTER SCIENCE
UNDER CBCS PATTERN (2021-22)
SUMMARY OF CHANGES IN SYLLABI

	Title of the Course(Paper)	Changes
SEM-I	Problem Solving in C	Unit I: Removed Design and implementation of correct ,efficient and maintainable programs Unit IV- Removed union inside structures
	Problem Solving in C – Lab	
SEM-II	Data Structures using C	:UnitII Removed the Array Basics Unit V: added quick sort Removed shortest path
	Data Structures using C – Lab	
SEM-III	DATABASE MANAGEMENT SYSTEMS	Unit 1 : Removed Cost and risks of DBMS added :situations where Dbms is not necessary Unit III : Added boyce codd normal form Additional Inputs: ransaction management and Concurrency control: ACID properties,serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, database recovery management.
	DATABASE MANAGEMENT SYSTEMS – Lab	Programs on PL/SQL included
SEM-IV	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA	Unit V: removed working with MYSQL database ,retrieving data fro MYSQL database Addition inputs: Wrapper Classes,auto boxing and unboxing
SEM IV	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA – Lab	Program on packages included
SEM IV	Operating Systems	unitIII: Included case studies on unix,windows Unit V: removed Small Application Development using Android Development Framework.
SEM IV	Operating Systems - Lab	Included Unix commands and shell scripting Removed simulation experiments

PANEL OF NAMES FOR APPOINTMENT OF EXAMINERS/PAPERSETTERS
2021-22

S.NO	NAME OF THE LECTURER	NAME OF THE COLLEGE
1	Dr. N Sridhar	GDC Tuni
2	Smt. Naga Subramanyeswari	ASD Women's College ,Kakinada
3	Sri. D.Suneel	G.D.C.(A), Rajamahendravaram
4	Smt. G Satya Suneetha	ASD Women's College ,Kakinada
5	Sri RASMI RANJAN KHANSAMA	GDC TUNI
6	Dr. Ch. V. M. Hari	Dr VS Krishna G.D.C.(A), Visakhapatnam
7	Sri. D. V. Raghava Swamy	Dr VS Krishna G.D.C.(A), Visakhapatnam
8	Sri BODALA RAVI	GDC Tuni
9	N.NagaSubrahmanyeswari	ASD GDC(A) W, Kakinada
10	SSVAS Samba Murthy	GDC, Paderu
11	Dr Jahnavi	VS Krishna College, Visakhapatnam

I B.Sc. – Computer Science / Semester- I (W.E.F. 2020-2021)

COURSE: PROBLEM SOLVING IN C

COURSE CODE: C1

Total Hrs. of Teaching-Learning: 60 @ 4 h / Week

Total Credits: 03

Objective: This course aims to provide exposure to problem-solving through programming.

It introduces the concepts of the C Programming language.

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

1. Understand the evolution and functionality of a Digital Computer.
2. Apply logical skills to analyse a given problem
3. Develop an algorithm for solving a given problem.
4. Understand 'C' language constructs like Iterative statements, Array processing, Pointers, etc.
5. Apply 'C' language constructs to the algorithms to write a 'C' language program.

MODULE--I:

12hr

- a) **General Fundamentals:** Introduction to computers: Block diagram of a computer, characteristics and limitations of computers, applications of computers, types of computers, computer generations.
- b) **Introduction to Algorithms and Programming Languages:** Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages – Structured Programming Language.

MODULE--II:

10hr

- a) **Introduction to C:** Introduction – Structure of C Program – Writing the first C Program File used in C Program – Compiling and Executing C Programs – Using Comments Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples.
- b) **Decision Control and Looping Statements:** Introduction to Decision Control Statements– Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement

MODULE –III:

12hr

- a) **Arrays:** Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array– Operations on Arrays – one dimensional, two dimensional and multi- dimensional arrays, character handling and strings.

MODULE—IV:

18hr

- a) **Functions:** Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.
- b) **Structure, Union, and Enumerated Data Types:** Introduction – Nested Structures – Arrays of Structures – Structures and Functions– Union – Arrays of Unions Variables – Unions inside Structures – Enumerated Data Types.

MODULE—V:

18hr

- a) **Pointers:** Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Memory Allocation in C Programs – Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers
- b) **Files:** Introduction to Files – Using Files in C – Reading Data from Files – Writing Data to Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments.

Reference Books:

1. E Balagurusamy – Programming in ANSIC – Tata McGraw-Hill publications.
2. Brain W Kernighan and Dennis M Ritchie - The ‘C’ Programming language” - Pearson publications.
3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications.
4. Yashavant Kanetkar - Let Us ‘C’ – BPB Publications.
- 5.

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

I B.Sc. – Computer Science / Semesters- I / Paper-I Syllabus
Practical Paper - I:
COURSE NAME: PROBLEM SOLVING IN C Lab
Course Code: C1L

Practical/Laboratory-I
DATA STRUCTURE USING IN C

Marks:50

1. Write a program to check whether the given number is Armstrong or not.
2. Write a program to find the sum of individual digits of a positive integer.
3. Write a program to generate the first n term of the Fibonacci sequence.
4. Write a program to find both the largest and smallest number in a list of integers.
5. Write a program to demonstrate recursion of parameters in swapping of two integer values using **Call by Value & Call by Address**
6. Write a program that uses functions to add two matrices.
7. Write a program to calculate factorial of given integer value using recursive functions
8. Write a program for multiplication of two NXN matrices.
9. Write a program to perform various string operations.
10. Write a program to search an element in a given list of values.
11. Write a program to sort a given list of integers in ascending order.
12. Write a program to calculate the salaries of all employees using **Employee(ID, Name, Designation, Basic Pay, DA, HRA, Gross Salary, Deduction, Net Salary)** structure.
 - a. DA is 30% of Basic Pay
 - b. HRA is 15% of Basic Pay
 - c. Deduction is 10% of (Basic Pay + DA)
 - d. Gross Salary = Basic Pay + DA + HRA
 - e. Net Salary = Gross Salary - Deduction
13. Write a program to illustrate pointer arithmetic.
14. Write a program to read the data character by character from a file.
15. Write a program to create **Book(ISBN, Title, Author, Price, Pages, Publisher)** structure and store book details in a file and perform the following operations
 - a. Add book details
 - b. Search a book details for a given ISBN and display book details, if available
 - c. Update a book details using ISBN
 - d. Delete book details for a given ISBN and display list of remaining Books

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2021-2022
I B.SC (CS) 2020-2023 BATCH
COMPUTER SCIENCE COURSE: PROBLEM SOLVING IN C

COURSE CODE:C1
SEMESTER-I

Time : 2.30 Hrs.

Max. Marks: 50

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	6	10	60	3	10	30
TOTAL		13		95	TOTAL MARKS		50

$$\text{Percentage of choice given} = \frac{95 - 50}{95} \times 100 = \frac{45}{95} \times 100 = 47.36\%$$

P.R.GOV.T.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPERS FOR THE YEAR 2021-2022
I B.Sc (CS) 2020-2023 BATCH
COMPUTER SCIENCE COURSE: PROBLEM SOLVING IN C

Time : 2.30 Hrs.

SEMESTER-I

Max. Marks: 50

SECTION-A

Answer any FOUR Questions

(4x5=20M)

1. Write the characteristics of computers?
2. Explain the generations of computers?
3. Explain various data types in C?
4. Explain Control statements?
5. Explain about String handling functions?
6. Distinguish between Structures and Unions.
7. Write about File operations in C?

SECTION-B

Answer All Questions

(3x10=30M)

8. a) Explain the Logical Organization of a Digital Computer with the help of Block Diagram?
(Or)
b) Write about the classification of computer in detail?
9. a) Explain various Conditional Control Statements in 'C' with examples?
(Or)
b) Explain the difference different types Array?
10. a) Explain different types of Functions in C?
(Or)
b) Explain about different types of Pointers in C?

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2021-2022
I B.SC (CS) 2020-2023 BATCH
Computer Science Course: PROBLEM SOLVING IN C
COURSE CODE:C1

Time : 2.30 Hrs.

SEMESTER-I

Max. Marks: 50

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
MODULE -I	2	2	30
MODULE -II	1	2	20
MODULE -III	1	1	15
MODULE – IV,V	2	2	30
Total No. of questions	6	8	
Total Marks Including choice			95

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
I B.SC (CS) 2020-2023 BATCH
SEMESTER-I
COURSE CODE: C1
COURSE NAME: PROBLEM SOLVING IN C

MODULE--I

Essay Questions:

1. Explain the Logical Organization of a Digital Computer with the help of Block Diagram?
2. Write about the classification of computer in detail?
3. How many Generations of Computers are there till date? Explain in each Generation in detail.

Short Answer Question:

1. Write the characteristics of Computer?
2. Explain the Generations of Computer?
3. Explain Applications of Computer?
4. Explain Programming Languages?
5. Explain about Algorithms, and Flow chart?

MODULE-II

Essay Questions:

1. Explain various Operators in C with example.
2. Explain various Conditional Control Statements in C with example.
3. Explain various Conditional Looping statements in C with example?

Short Answer Question:

1. Write the importance of C language
2. Explain about various constants in C.
3. Explain various data types in C.
4. Explain Structure of C language?
5. Explain Control Statements in C?

MODULE-III

Essay Questions

1. Explain different types of Arrays in C?
2. Explain various String handling Functions in C.
3. Explain multi- dimensional arrays in C?

Short Answer Question

1. Explain two dimensional arrays to functions.
2. Explain how to pass arrays to functions.
3. Write any three String handling functions in C

MODULE-IV

Essay Questions

1. Explain different types of Functions in C?
2. What is Structure? Give declaration of structures. Explain structure within structure.
3. What is Union? Explain in detail.
4. Explain the Storage classes in c?

Short Answer Question

1. Write the difference between structure and union?
2. Write about Storage classes in C.
3. Write about Structure arrays give example?

MODULE-V

Essay Questions

1. Explain about Pointers in detail?
2. Explain about basic File operators in C?
3. Explain about pointer to functions with an example?
4. Explain about different types of Pointers in C?

Short Answer Question

1. Write about Pointers to arrays in C?
2. What is Dynamic Memory allocation?
3. Explain Read and Write data to file?

I B.Sc. – Computer Science / Semester- II (W.E.F. 2020-2021)

Course: DATA STRUCTURES USING C

Course Code: C2

Total Hrs. of Teaching-Learning: 60 @ 4 h / Week

Total Credits: 03

Objectives – To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficient algorithms.

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

1. Understand available Data Structures for data storage and processing.
2. Comprehend Data Structure and their real-time applications - Stack, Queue, Linked List, Trees and Graph
3. Choose a suitable Data Structures for an application
4. Develop ability to implement different Sorting and Search methods
5. Have knowledge on Data Structures basic operations like insert, delete, search, update and traversal
6. Design and develop programs using various data structures
7. Implement the applications of algorithms for sorting, pattern matching etc

MODULE I:

12Hrs

- a) **Introduction to Data Structures:** Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures, Refinement Stages
- b) **Principles of Programming and Analysis of Algorithms:** Software Engineering, Program Design, Algorithms, Different Approaches to Designing an Algorithm, Complexity, Big ‘O’ Notation, Algorithm Analysis, Structured Approach to Programming, Recursion, Tips and Techniques for Writing Programs in ‘C’

MODULE II:

12Hrs

- a) **Arrays:** Introduction to Linear and Non- Linear Data Structures, One- Dimensional Arrays, Array Operations, Two- Dimensional arrays, Multidimensional Arrays, Pointers and Arrays, an Overview of Pointers
- b) **Linked Lists:** Introduction to Lists and Linked Lists, Dynamic Memory Allocation, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Atomic Linked List, Linked List in Arrays, Linked List versus Arrays

MODULE -III:

HRS: 10

- a) **Stacks:** Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks, Stacks and Recursion
- b) **Queues:** Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues

MODULE -IV:

HRS: 12

- a) **Binary Trees:** Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of Binary Trees, Applications of Binary Tree

MODULE -V:**HRS: 12**

- a) **Searching and sorting:** Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, Quick sort Searching – An Introduction, Linear or Sequential Search, Binary Search, Indexed Sequential Search.
- b) **Graphs:** Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Application of Graphs.

Prescribed Books:

1. “Data Structures using C”, ISRD group Second Edition, TMH
2. “Data Structures through C”, Yashavant Kanetkar, BPB Publications
3. “Data Structures Using C” Balagurusamy E. TMH

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

I B.Sc. – Computer Science / Semesters- II / Paper-II Syllabus
Practical Paper - II:
COURSE NAME: DATA STRUCTURE USING IN C
Course Code: C2

Practical/Laboratory-II

DATA STRUCTURE USING IN C

Marks:50

1. Write a program to read 'N' numbers of elements into an array and also perform the following operation on an array
 - a. Add an element at the beginning of an array
 - b. Insert an element at given index of array
 - c. Update a element using a values and index
 - d. Delete an existing element
2. Write a program using stacks to convert a given
 - a. postfix expression to prefix
 - b. prefix expression to postfix
 - c. infix expression to postfix
3. Write Programs to implement the Stack operations using an array
4. Write Programs to implement the Stack operations using Linked List.
5. Write Programs to implement the Queue operations using an array.
6. Write Programs to implement the Queue operations using Linked List.
7. Write a program for arithmetic expression evaluation.
8. Write a program for Binary Search Tree Traversals
9. Write a program to implement dequeue using a doubly linked list.
10. Write a program to search an item in a given list using the following Searching Algorithms
 - a. Linear Search
 - b. Binary Search.
11. Write a program for implementation of the following Sorting Algorithms
 - a. Bubble Sort
 - b. Insertion Sort
 - c. Quick Sort
12. Write a program for polynomial addition using single linked list
13. Write a program to find out shortest path between given Source Node and Destination Node in a given graph using Dijkstra's algorithm.
14. Write a program to implement Depth First Search graph traversals algorithm
15. Write a program to implement Breadth First Search graph traversals algorithm

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2021-2022
I B.SC (CS) 2020-2023 BATCH
Course: DATA STRUCTURES USING C

Time : 2.30 Hrs.

SEMESTER-II

Max. Marks:50

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	6	10	60	3	10	30
TOTAL		13		95	TOTAL MARKS		50

$$\text{Percentage of choice given} = \frac{95 - 50}{95} \times 100 = \frac{45}{95} \times 100 = 47.36\%$$

P.R.GOV.T.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPERS FOR THE YEAR 2020-2021
I B.Sc (CS) 2020-2023 BATCH
Computer Science Course: DATA STRUCTURES USING C

Time : 2.30 Hrs.

SEMESTER-II

Max. Marks: 50

SECTION – A

Answer any FOUR Questions

4 x 5 = 20M

1. Explain the Primitive Data Structures?
2. Explain about ADT?
3. Explain types of arrays?
4. Explain about Queue?
5. Explain about Tree implementations and applications.
6. Explain Minimal Spanning Trees?
7. Explain Insertion Sort.

SECTION – B

Answer all the Questions

3 x 10 =30 M

8. A. What are the goals of Data structure? Write note on linear and Non Linear data structure with examples.

OR

B. What is Array? Explain about types of Arrays with syntax and suitable examples

9. A. What is a Linked list? Explain linked list in array.

OR

B. What is a stack? Explain the algorithm to create and delete items in stack.

10. A. What is Binary tree? Explain Binary tree traversal

OR

B. Explain Merge sort algorithm with an example?

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2021-2022
I B.SC (CS) 2020-2023 BATCH

Course: DATA STRUCTURES USING C

Course Code: C2

SEMESTER-II

Time: 2.30 Hrs.

Max. Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
MODULE -I	1	2	20
MODULE -II	2	1	25
MODULE -III	1	1	15
MODULE – IV,V	2	3	35
Total No. of questions	6	7	
Total Marks Including choice			95

**P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2021-2022
I B.SC (CS) 2020-2023 BATCH**

Course: DATA STRUCTURES USING C

Question Bank (W.E.F.2020-2021)

Course Code: C2

Subject: Data Structures Using C

Max.Marks:60

MODULE I

Short Answer Questions

1. Explain asymptotic notation
2. Explain recursion in detail

Essay Questions:

1. What are the goals of data structure? Write note on linear and Non Linear data structure with examples.
2. Explain tips and techniques for writing programs in c

MODULE II

Short Answer Questions

1. Explain Multi dimensional arrays
2. Explain Dynamic memory allocation
3. Write the advantages and disadvantages of array and linked list.
4. Explain basic linked list operations

Essay Questions:

1. Explain double linked list implementation in C
2. Explain circular list implementation in C

Module III

Short Answer Questions

1. Explain Stack ADT
2. Explain Queue ADT
3. Explain Priority Queues?
4. Explain applications of queues?

Essay Questions:

1. What is a stack? Explain the algorithm to insert and delete items in a stack.
2. What is a queue? Explain the algorithm to create and delete items in a queue.
3. Explain the applications of stack?

Module IV

Short Answer Questions

1. Explain about representation of a Binary Tree?.
2. Explain Properties of Binary Trees?
3. Briefly explain Binary Tree Traversals?
4. Explain Operations on a BST?

Essay Questions:

1. Explain applications of Binary Tree?
2. Write an algorithm for delete operation on a BST?
3. Explain BST Traversals?

Module V

Short Answer Questions

1. Explain about Binary Searching.
2. Explain Insertion Sort.
3. Explain about Bubble Sort
4. Explain about Binary Search

Essay Questions:

1. Explain Merge sort algorithm with an example?
2. What is a Graph? Explain representations of a Graph
3. Briefly explain linear and binary search algorithms?

P.R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
I BSC (CS) 2020– 2021 BATCH
COURSE NAME: DATA STRUCTURES USING IN C
Course Code: C2
I B.Sc (CS) SEMESTER-II

SCHEME OF VALUATION (W.E.F. 2020-2021)

Time: 2 Hrs

Marks: 100

Practical/Laboratory – II

- | | |
|------------------------|----------|
| 1. Internal Practicals | 50 Marks |
| 2. External Practicals | 50 Marks |

Life Skills – 1
P R GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
BASIC COMPUTER APPLICATIONS (BCA) SEMESTER-I (W.E.F 2020-21)

I B.A/B.Sc/B.Com (Common for All Degree)

I - Semester
(30 Hours of Teaching)

Objectives:

This course aims at providing exposure to students in skill development towards basic office applications.

Course Learning Outcomes:

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

1. Demonstrate basic understanding of computer hardware and software.
2. Apply skills and concepts for basic use of a computer.
3. Identify appropriate tool of MS office to prepare basic documents, charts, spreadsheets and presentations.
4. Create personal, academic and business documents using MS office.
5. Create spreadsheets, charts and presentations.
6. Analyze data using charts and spread sheets.

Unit-I: (08 hrs)

Basics of Computers: Definition of a Computer - Characteristics of computers, Applications of Computers – Block Diagram of a Digital Computer – I/O Devices, hardware, software human ware, application software, system software, Memories - Primary, Auxiliary and Cache Memory.

MS Windows : Desktop, Recycle bin, My Computer, Documents, Pictures, Music, Videos, Task Bar, Control Panel.

Unit-II: (08 hrs)

MS-Word : Features of MS-Word - MS-Word Window Components - Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Mail Merge.

Unit-III: (10 hrs)

MS-Excel : Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Inserting Rows/Columns –Changing column widths and row heights, Formulae, Referencing cells , Changing font sizes and colors, Insertion

of Charts, Auto fill, Sort.

MS-PowerPoint: Features of PowerPoint – Creating a Presentation - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and scaling of an Object – Slide Transition – Custom Animation.

RECOMMENDED CO-CURRICULAR ACTIVITIES: (04 hrs)

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside
 - a. The syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz, Group Discussion
4. Solving MCQ's available online.
5. Suggested student hands on activities:
 - Create two folders, Rename the folder, create two files each using notepad and paint, move the files from one folder to another folder, delete a file you have created, copy and paste text within notepad.
 - Create a letter head for your college with watermark, your resume, visiting card, brochure for your college activity, organization chart for your college, any advertisement, Prepare your Class time table.
 - Prepare your mark sheet, Prepare your class time table, Prepare a salary bill for an organization, Sort the bill as per the alphabetical order of the names, Get online weather data and analyze it with various charts.
 - Create a PowerPoint presentation for a student seminar.

REFERENCE BOOKS:

1. Working in Microsoft Office – Ron Mansfield - TMH.
2. MS Office 2007 in a Nutshell –Sanjay Saxena – Vikas Publishing House.
3. Excel 2020 in easy steps-Michael Price – TMH publications

P.R. GOVT COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPER (W.E.F. 2020-21)
I B.A/B.Sc/B.Com (Common for All Degree)

SEMESTER –I

Sub: BASIC COMPUTER APPLICATIONS (BCA)
Time: 2 hrs

Paper: I
Marks: 50

SECTION – A

Answer any FOUR questions the following

4 x 5= 20 M

1. Write about characteristics of Computer.
2. Explain Primary and Secondary memory devices.
3. Explain Desktop and Recycle bin.
4. Explain feature of MS-Word.
5. Explain header and Footer in MS-Word.
6. Explain feature of MS-Excel.
7. How to inserting Rows and Columns in MS-Excel
8. Explain features of MS-Power point.

SECTION – B

Answer any THREE questions the following

3 x 10= 30 M

9. Draw and explain block diagram of Computer in details.
10. Explain various input and output devices.
11. Describe the features of MS Windows.
12. What is Mail-Merge? Explain Mail-Merge concept in MS-Word.
13. Explain the procedure how to create worksheets in MS Excel.
14. Explain Types of Views in MS-Power point.

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P.R. GOVT COLLEGE (AUTONOMOUS), KAKINADA
QUESTION BANK (W.E.F. 2020-21)
I B.A/B.Sc/B.Com (Common for All Degree)

BASIC COMPUTER APPLICATIONS (BCA)

SEMESTER-I

QUESTION BANK

UNIT-I

Short Answer Questions:

1. Write about characteristics of Computer?
2. Explain various Applications of Computers?

Essay Answer Questions:

3. Discuss block diagram of Computer in details?
4. Explain various input and output devices?

UNIT-II

Short Answer Questions:

1. Explain Primary and Secondary memory devices?
2. Explain Desktop and Recycle bin?

Essay Answer Questions:

3. Explain How to Creating Table in MS-Word?
4. What is Mail-Merge? Explain Mail-Merge concept in MS-Word?.

UNIT-III

Short Answer Questions:

1. Explain feature of MS-Powerpoint?
2. How to inserting Rows and Columns in MS-Excel ?

Essay Answer Questions:

3. Explain the procedure how to create worksheets in MS Excel?
4. Explain how to create a presentation in MS Powerpoint?

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2020-21)
I B.A/B.Sc/B.Com (Common for All Students)

BASIC COMPUTER APPLICATIONS (BCA)

SEMESTER -I

SUBJECT: BCA
PAPER- I

Time: 2 Hrs
Marks: 50

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	8	5	40	4	5	20
2	Section-B Essay Questions	5	10	60	3	10	30
TOTAL MARKS				100	TOTAL MARKS		50

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2019-20)
I B.A/B.Sc/B.Com (Common for All Degree)

BASIC COMPUTER APPLICATIONS (BCA)

SEMESTER- I

SUBJECT: BCA
PAPER- I

Time: 2 Hrs
Marks :50

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Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-I	2	3	35
UNIT-II	2	3	35
UNIT-III	2	2	30
Total No. of questions	6	8	
Total Marks Including choice			100

P.R.COLLEGE (AUTONOMOUS), KAKINADA

B.Sc./B.Com/B.A

Syllabus under CBCS w.e.f.2020-21

INFORMATION & COMMUNICATION TECHNOLOGY

Semester	Course Code	Course Title	Hours	Credits
II	Life skill Course	INFORMATION & COMMUNICATION TECHNOLOGY	30	2

Objectives:

This course aims at acquainting the students with basic ICT tools which help them in their day to day and life as well as in office and research.

Course outcomes: After completion of the course, student will be able to;

1. Understand the literature of social networks and their properties.
2. Explain which network is suitable for whom.
3. Develop skills to use various social networking sites like twitter, flickr, etc.
4. Learn few GOI digital initiatives in higher education.
5. Apply skills to use online forums, docs, spreadsheets, etc for communication, collaboration and research.
6. Get acquainted with internet threats and security mechanisms.

SYLLABUS:

UNIT-I: (08 hrs)

Fundamentals of Internet: What is Internet?, Internet applications, Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet, Browser – Types of Browsers, Introduction to Social Networking: Twitter, Tumblr, LinkedIn, Facebook, flickr, Skype, yahoo, YouTube, WhatsApp .

UNIT-II:(08 hrs)

E-mail: Definition of E-mail -Advantages and Disadvantages –User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, MessageComposition, Mail Management.

G-Suite: Google drive, Google documents, Google spread sheets, Google Slides and Google forms.

UNIT-III:(10 hrs)

Overview of Internet security, E-mail threats and secure E-mail, Viruses and antivirus software, Firewalls, Cryptography, Digital signatures, Copyright issues.

What are GOI digital initiatives in higher education? (SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, e-acharya, e-Yantra and NPTEL).

RECOMMENDED CO-CURRICULAR ACTIVITIES: (04 hrs)

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

1. Assignments(in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))

Quiz and Group Discussion

3. Slip Test

4. Try to solve MCQ's available online.

5. Suggested student hands on activities :

- a. Create your accounts for the above social networking sites and explore them, establish a video conference using Skype.
- b. Create an Email account for yourself- Send an email with two attachments to another friend. Group the email addresses use address folder.
- c. Register for one online course through any of the online learning platforms like NPTEL, SWAYAM, Alison, Codecademy, Coursera. Create a registration form for your college campus placement through Google forms.

Reference Books :

1. In-line/On-line : Fundamentals of the Internet and the World Wide Web, 2/e – by Raymond Greenlaw and Ellen Hepp, Publishers : TMH
2. Internet technology and Web design, ISRD group, TMH.
3. Information Technology – The breaking wave, Dennis P.Curtin, Kim Foley, Kunai Sen and Cathleen Morin, TMH.

P.R.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPER (W.E.F 2020-21)
B.Sc./B.Com/B.A
INFORMATION & COMMUNICATION TECHNOLOGY
SEMESTER-II

Time: 2 Hrs
PAPER- II

Marks: 50

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	8	5	40	4	5	20
2	Section-B Essay Questions	6	10	60	3	10	30
TOTAL MARKS				100	TOTAL MARKS		50

**P.R.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPER (W.E.F 2020-21)**

**B.Sc./B.Com/B.A
INFORMATION & COMMUNICATION TECHNOLOGY
SEMESTER-II**

Time: 2 Hrs

Marks: 50

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-I	2	3	35
UNIT-II	2	3	35
UNIT -III	2	2	30
Total No. of questions	6	8	100

P.R.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPER (W.E.F 2020-21)
B.Sc./B.Com/B.A
INFORMATION & COMMUNICATION TECHNOLOGY
SEMESTER-II

Sub: ICT
Time: 2 hrs

Paper: II
Marks: 50

SECTION – A

Answer any FOUR questions the following

4 x 5= 20 M

1. Discuss briefly about advantages and disadvantages of Internet.
2. Explain about browsers.
3. What is URL? What are the Components of URL?
4. Explain about Email Addresses, Domain Names.
5. Explain about Google spread sheets.
6. Explain about Google forms.
7. What is a Computer Virus? Explain types of viruses.
8. What is Internet security?

SECTION – B

Answer any THREE questions the following

3 x 10= 30 M

9. What is a Browser? Explain the different types of Browsers?
10. Explain about Social Networking sites with examples.
11. Define E-Mail. What are the advantages and disadvantages of E-mail?
12. Explain the Procedure for composing and sending an E-mail.
13. Discuss about Firewalls, Cryptography, Digital signatures.
14. Explain GOI digital initiatives in higher education.

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
QUESTION BANK (W.E.F. 2020-2021)
B.Sc./B.Com/B.A
INFORMATION & COMMUNICATION TECHNOLOGY
SEMESTER-II
QUESTION BANK

UNIT -I

Short Answer Questions:

1. Discuss briefly about advantages and disadvantages of Internet.
2. Explain about browsers.
3. What is URL? What are the Components of URL?
4. Explain about YouTube, WhatsApp.

Essay Answer Questions:

5. What is Internet? Explain about Internet applications.
6. What is a Browser? Explain the different types of Browsers?
7. Explain about Social Networking sites with examples.

UNIT-II

Short Answer Questions:

1. What are the advantages of E-mail?
2. Explain about Email Addresses, Domain Names.
3. Explain about Google spread sheets.
4. Explain about Google forms.

Essay Answer Questions:

5. Define E-Mail. What are the advantages and disadvantages of E-mail?
6. Explain the Procedure for composing and sending an E-mail.
7. Explain about G-Suite.

UNIT-III

Short Answer Questions:

1. What is a Computer Virus? Explain types of viruses.
2. What is Internet security?
3. Explain about E-mail threats.

Essay Answer Questions:

4. Discuss about Firewalls, Cryptography, Digital signatures.
5. Explain GOI digital initiatives in higher education.

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. (CS)-SEMESTER-III
Data Base Management System

Course Objective:

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

Course Outcomes:

On completing the subject, students will be able to:

- Explain the basic concepts of databases, data models, database architecture and development steps.
 - Design and implement properly structured databases that match the standards based under realistic constraints.
 - Comprehend how to use Structured Query Language (SQL) to define and manipulate database information
 - Write Relational Algebra and Relational Calculus queries
 - Apply various Normalization techniques to improve database design.
-

UNIT I

Overview of Database Management System: Introduction, file-based system, Drawbacks of file-Based System, Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management System, Classification of Database Management Systems, DBMS Approach, advantages of DBMS, data models, Components and Interfaces of Database Management System. Database Architecture, Situations where DBMS is not necessary.

UNIT II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, IS A relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition, entity clusters, connection types, advantages of ER modeling.

UNIT III

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC).

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3NF), Boyce-Codd normal form (BCNF)

UNIT IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operation, View, Sub Query, Embedded SQL.

UNIT V

PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

Additional Inputs:

Transaction management and Concurrency control: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, database recovery management.

Reference Books

1. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010, 9780073523323
2. "Database Management Systems" by Raghu Ramakrishnan, McGrawhill, 2002,
3. Fundamentals of Relational Database Management Systems by S. Sumathi, S. Esakkirajan, Springer Publications
4. "An Introduction to Database Systems" by Bipin C Desai
5. "Principles of Database Systems" by J. D. Ullman
6. "Fundamentals of Database Systems" by R. Elmasri and S. Navathe

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2020-2021)
II B.Sc. (CS) SEMESTER-IV

SUBJECT: DATABASE MANAGEMENT SYSTEMS
PAPER- IV

Time: 2½ Hrs.
Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL MARKS				115	TOTAL MARKS		60

$$115 - 60 = 55$$

$$\text{Percentage of choice given} = \frac{\quad}{105} \times 100 = \frac{55}{115} \times 100 = 47.82\%$$

$$105 \qquad 115$$

PR GOVT COLLEGE (A)::KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc.(CS)-SEMESTER-III
Data Base Management System

Time:2^{1/2}Hrs

Max. Marks:60

SECTION -A

Answer Any Four Questions

4 x 5 = 20M

1. Explain roles and responsibilities of DBA?
2. Write about attribute classification in ER Model
3. What is weak entity? Explain with suitable example.
4. Compare and contrast relational algebra and relational calculus.
5. Explain aggregate functions in SQL
6. Explain join operations in SQL
7. Explain conditional statements in PL/SQL

SECTION - B

Answer ALL questions

4 x 10M = 40M

8. a) What is data model? Explain different data models in DBMS.
(OR)
b) Explain components and interfaces of DBMS
9. a) What is E-R diagram? What are the building blocks of E-R diagram?
(OR)
b) Explain about relational operators in relational algebra
10. a) Explain Codd's relational data base rules?
(OR)
b) Discuss about nested and correlated nested queries with suitable examples.
11. a) Explain about loop control structures in PL/SQL?
(OR)
b) What is meant by a cursor? Explain about implicit and explicit cursors with examples

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2020-2021)
II B.SC (CS) SEMESTER-III
SUBJECT: Database Management Systems

Time: 2½ Hrs

Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	1	25
Module-2	1	2	20
Module-3	2	1	25
Module-4	1	2	20
Module-5	2	1	25
Total No. of questions	8	7	115

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. (CS)-SEMESTER-III
Data Base Management System
QUESTION BANK

LONG ANSWER QUESTIONS:

UNIT-I

1. Explain about characteristics of file-based system? Write about drawbacks of file-based systems?
2. What is data model? Explain different data models in DBMS.
3. Explain about advantages and disadvantages of DBMS?
4. Explain about of classification of DBMS?
5. Explain about components and interfaces of DBMS?
6. Explain the three-level architecture of data base system?

UNIT-II

1. What do you mean by E-R-Model? Explain the degree of relationship in E-R-Model?
2. Write about generalization, specialization in E-R-Model?
3. What is E-R Diagram? What are the building blocks of E-R Diagram?

UNIT-III

1. Explain about Codd's relational data base rules?
2. Explain about relational operators in relational algebra?
3. What is integrity constraint? Explain different types of constrains in relational model?

UNIT-IV

4. Explain DDL, DML, and DCL in SQL?
1. Write about different joins in SQL?
2. Explain about views in SQL in detail?

UNIT-V

1. Explain about PL/SQL block structure in detail.
2. Explain about loop control structures in PL/SQL.
3. What is meant by a cursor? Explain implicit and explicit cursors with examples.

SHORT ANSWERS

UNIT-I

1. Write about objectives of DBMS?
2. Write about roles and responsibilities of DBA?

3. Write about data Independence?

UNIT-II

1. write about attribute classification in E-R model?
2. What is weak entity? Explain with suitable example.

UNIT-III

1. explain about relation model?
2. what is Normalization? when it is used in RDBMS?
3. What is meant by a key? What are different types of keys available in relational model?

UNIT-IV

1. Explain different data types in SQL?
2. Write about select statement with example?
3. Write about aggregate function in SQL?

UNIT-V

1. Write about trigger?
2. Explain basic loops in PL/SQL.
3. Explain conditional statements in PL/SQL

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. (CS)-SEMESTER-III
DATABASE MANAGEMENT SYSTEMS LAB

1. Draw ER diagrams for train services in a railway station
2. Draw ER diagram for hospital administration
3. Creation of college database and establish relationships between tables
4. Write a view to extract details from two or more tables
5. Write a stored procedure to process students results
6. Write a program to demonstrate a function
7. Write a program to demonstrate blocks, cursors & database triggers.
8. Write a program to demonstrate Joins
9. Write a program to demonstrate sub queries
10. Write a program to demonstrate of Aggregate functions
11. Creation of Reports based on different queries
12. Usage of file locking table locking, facilities in applications.

P R GOVT COLLEGE(A), KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc (CS) - Semester- IV (W.E.F. 2020-2021)
OBJECT ORIENTED PROGRAMMING USING JAVA (C4)

Total Hrs. of Teaching-Learning: 60 @ 4 h / Week

Total Credits: 03

Objectives:

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

Course Learning Outcomes: At the end of this course student will:

1. Understand the benefits of a well-structured program
 2. Understand different computer programming paradigms
 3. Understand underlying principles of Object-Oriented Programming in Java
 4. Develop problem-solving and programming skills using OOP concepts
 5. Develop the ability to solve real-world problems through software development in high-level programming language like Java
-

UNIT – I

Introduction to Java: Features of Java, The Java virtual Machine, Parts of Java

Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals

Operators in Java: Operators, Priority of Operators

Control Statements in Java: if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement

Input and Output: Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String. format()

Arrays: Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments

UNIT – II

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings

Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object-Oriented Programming System (OOPS)

Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword „this“, Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods

Inheritance: Inheritance, The keyword „super“, The Protected Specifier, Types of Inheritance

Additional Topics: wrapper classes, auto boxing ,unboxing

UNIT – III

Polymorphism: Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

Type Casting: Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class

Abstract Classes: Abstract Method and Abstract Class

Interfaces: Interface, Multiple Inheritance using Interfaces

Packages: Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception

UNIT – IV

Streams: Stream, Creating a File using FileOutputStream, Reading Data from a File using FileInputStream, Creating a File using FileWriter, Reading a File using FileReader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

Threads: Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle

UNIT – V

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, , Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements, Using jdbc–odbc Bridge Driver to Connect to Oracle Database, , Retrieving Data from MS Access Database, Stored Procedures and CallableStatements, Types of Result Sets.

Prescribed Book:

1. E .Balaguru swamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.

Reference Books:

1. John R. Hubbard, Programming with Java, Second Edition, Schaum’s outline Series, TMH.
2. Deitel &Deitel. Java TM: How to Program, PHI (2007)
3. Java Programming: From Problem Analysis to Program Design- D.S Mallik
4. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)
5. Java complete reference.

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2020-2021)
II B.Sc (CS) SEMESTER-IV

SUBJECT: OBJECT ORIENTED PROGRAMMING USING JAVA
PAPER- IV

Time: 2½ Hrs
Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL MARKS				115	TOTAL MARKS		60

$$\text{Percentage of choice given} = \frac{115 - 60}{105} \times 100 = \frac{55}{115} \times 100 = 47.82\%$$

P.R.GOV.T.COLLEGE (AUTONOMOUS), KAKINADA

MODEL PAPER (W.E.F. 2020-2021)

II B.Sc (CS) Course code: CP3204

SUBJECT: OBJECT ORIENTED PROGRAMMING USING JAVA Time: 2½ Hrs

PAPER-IV

Marks: 60

SEMESTER-IV

Section –A

Answer any 4 questions

4 x 5 =20M

1. What are the data types supported by Java?
2. Explain about constructors in java?
3. Explain types of inheritance in java?
4. Explain about abstract method and abstract classes?
5. Explain about File Input Stream and File Output Stream?
6. Explain about thread priority?
7. Explain about JDBC?

Section –B

Answer any 4 questions

4 x 10 = 40M

8. Explain the features of java?
(OR)
- . What is an Operator? Explain the Types of Operators in Java.
9. Explain about object oriented principles?
(OR)
- . Explain how multiple inheritance is implemented in java?
10. Explain how exceptional handling is done in java?
(OR)
- Explain the life cycle of thread?
11. Explain the life cycle of an applet?
(OR)
- Explain the stages in JDBC program?

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2020-2021)
II B.SC (CS) SEMESTER-III
Course code: C4

SUBJECT: OBJECT ORIENTED PROGRAMMING USING JAVA

Time: 2½ Hrs

Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	1	25
Module-2	1	2	20
Module-3	2	1	25
Module-4	1	2	20
Module-5	2	1	25
Total No. of questions	8	7	
Total Marks Including choice			115

P R GOVERNMENT (AUTONOMOUS) COLLEGE, KAKINADA

QUESTION BANK (W.E.F. 2020-2021)

II B.Sc (CS) Course code: CP3204

SEMESTER-IV

Subject: OBJECT ORIENTED PROGRAMMING USING JAVA

Max.Marks:60

QUESTION BANK

Module I

Short Questions: (5M)

1. What are the data types supported by Java?
2. Explain about java virtual machine?
3. Explain about command line arguments?.
4. Explain structure of a java program?

Essay Questions: (10M)

1. Explain the features of java?.
2. What is an operator? Explain types of operators?
3. Explain about control structures in java?

Module II

Short Questions: (5M)

1. Explain about Constructures?
2. Explain types of inheritance?
3. Explain primitive data types in java?

Essay Questions: (10M)

1. Explain about object oriented principles?
2. Explain about access specifiers in java?
3. Explain classes and methods in Java with examples?

Module III

Short Questions: (5M)

1. Explain about abstract methods and abstract classes?.
2. Explain final classes and final methods?.
3. Explain about types of errors?

Essay Questions: (10M)

1. Explain how multiple inheritance is implemented in java?.
2. Explain how exceptional handling is done in java?
3. What is a package? Explain the process of creating and using packages?

Module IV

Short Questions: (5M)

1. Explain File Input Stream and File Output Stream classes?
2. Explain thread priority?
3. Give applications of Threads?

Essay Questions: (10M)

1. Explain the lifecycle of thread?
2. Explain about FileReader and FileWriter classes

Module V

Short Questions: (5M)

1. Explain about jdbc?
2. Explain the process of adding Applet to HTML file?
3. Write a simple applet program?

Essay Questions: (10M)

1. Explain the life cycle of an applet?.
2. Explain the stages in jdbc program?

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA

**PRACTICALS (W.E.F. 2020—2021)
II B.Sc (CS) SEMESTER-IV**

PRACTICAL SYLLABUS

OBJECT ORIENTED PROGRAMMING USING JAVA LAB(C4L)

Hours:30 credits :2

1. Write a program to read *Student Name, Reg.No, Marks[5]* and calculate *Total, Percentage, Result*. Display all the details of students
2. Write a program to perform the following String Operations
 - a. Read a string
 - b. Find out whether there is a given substring or not
 - c. Compare existing string by another string and display status
 - d. Replace existing string character with another character
 - e. Count number of words in a string
3. Java program to implements Addition and Multiplication of two N X N matrices.
4. Java program to demonstrate the use of Constructor.
5. Java program on Method Overloading and Method Overriding.
6. Java program on packages.
7. Java program for implementing Interfaces
8. Java program on Multiple Inheritance.
9. Java program on Multithreading
10. Java program to demonstrate the exception handlings
11. Java program to demonstrate applets
12. Write a program to create *Book (ISBN, Title, Author, Price, Pages, Publisher)* structure and store book details in a file and perform the following operations
 - a. Add book details

- b. Search a book details for a given ISBN and display book details, if available
- c. Update a book details using ISBN
- d. Delete book details for a given ISBN and display list of remaining Books

PR GOVT COLLEGE (A) :: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc (CS)-SEMESTER-IV
OPERATING SYSTEM (C5)

Objectives:

This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management, etc.

Course Learning Outcomes:

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

1. Know Computer system resources and the role of operating system in resource management with algorithms
 2. Understand Operating System Architectural design and its services.
 3. Gain knowledge of various types of operating systems including Unix and Android.
 4. Understand various process management concepts including scheduling, synchronization, and deadlocks.
 5. Have a basic knowledge about multithreading.
 6. Comprehend different approaches for memory management.
 7. Understand and identify potential threats to operating systems and the security features design to guard against them.
 8. Specify objectives of modern operating systems and describe how operating systems have evolved over time.
 9. Describe the functions of a contemporary operating system
-

UNIT- I

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.

UNIT- II

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT III

Process Management: Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.

Concurrent and Dependent Processes, Critical Section, Semaphores, and Methods for Inter-process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer. Case studies: linux, windows

UNIT IV

Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

UNIT V

File and I/O Management, OS security : Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization
Introduction to Android Operating System, Android Development Framework, Android Application Architecture, Android Process Management and File System,

REFERENCE BOOKS:

1. Operating System Principles by Abraham Silber schatz, Peter Baer Galvin and Greg Gagne (7th Edition) Wiley India Edition.
2. Operating Systems: Internals and Design Principles by Stallings (Pearson)
3. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)
4. Online Resources for UNIT V

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

B. General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva-Voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations.
10. Peers and self-assessment, outputs from individual and collaborative work.

Operating Systems Lab

Objectives:

- To use linux operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems

Outcomes:

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.

List of Experiments:

1. Usage of following commands

Ls,pwd,tty,cat,who,who am I,rm, mkdir, rmdir,touch,cd.

2. Usage of following commands

Cal,cat(append),cat(concatenate),mv,cp,man,date.

3. Usage of following commands

Chmod,grep,tput(clear,highlight),bc.

4. Write a shell script to check if the number entered at the command line is Prime or not

5. Write a shell script to modify “cal” command to display calendars of the specified months.

6. Write a shell script to modify “cal” command to display calendars of the specified range of months.

7. Write a shell script to accept a login name. If not a valid login name display message “entered login name is invalid”

8. Write a shell script to display date in the mm/dd/yy format.

9. To implement the FCFS Algorithm.

10. To implement the shortest job First Algorithm.

11. To implement the priority algorithm.

12. To implement the round robin Algorithm.

13. To implement the FIFO page replacement algorithm

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA

MODEL BLUE PRINT FOR THE YEAR 2021-2022

II B.SC (CS) 2020-2023 BATCH

Course Code: C5

SEMESTER-VI

**SUBJECT: OPERATING SYSTEMS
PAPER- VII**

**Time: 2 1/2 Hrs
Max. Marks: 60**

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL		15		115	TOTAL MARKS		60

$$115 - 60 = 55$$

$$\text{Percentage of choice given} = \frac{55}{115} \times 100 = 47.82\%$$

$$\frac{55}{115} \times 100 = 47.82\%$$

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc(CS)-SEMESTER-IV
Paper-IV: Operating Systems

Time:2 ½ Hrs

Max. Marks: 60

SECTION - I

Answer Any FOUR questions

4 x 5M= 20 M

1. Explain Real Time System and Time sharing Operating System?
2. Write about Resource Abstraction?
3. Write about the Process and the Process state?
4. Explain Threading issues?
5. Write about some necessary and sufficient conditions for Deadlock?
6. Explain about Virtual memory?
7. Write about file Operations?

SECTION - III

Answer ALL questions

4 x 10M = 40M

8. a) What is Operating System? Explain functions of Operating System.
(Or)
b) Explain the various types of Operating System?
9. a) Explain about Process Scheduling Algorithms in detail?
(Or)
b) Explain System View of the Process and Resource?
10. a) Explain about Deadlock Detection and recovery?
(Or)
b) . Explain about classical Process Synchronization problems?
11. a) Explain about Segmentation and Memory Allocation Strategies?
(Or)
b) Explain Android Development Framework.

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR MODULE_WISE FOR THE YEAR 2021-2022
II B.SC (CS) 2020-2023 BATCH

Computer Science Course: Operating Systems

SEMESTER-IV

Time : 2.30 Hrs.

Max. Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
MODULE -I	2	2	30
MODULE -II	2	2	30
MODULE -III	2	1	25
MODULE – IV,V	2	2	30
Total No. of questions	8	7	
Total Marks Including choice			115

P.R. GOVT. COLLEGE (A), KAKINADA
II B.Sc (CS) (W.E.F 2020-2021)
QUESTION BANK

Subject: Operating Systems

Paper: IV

SEMESTER – IV

MODULE-I

Essay Questions:

1. What is Operating system? Explain function of Operating System.
2. Explain various types of Operating Systems?
3. Explain about Multiprogramming System?

Short Questions:

4. Explain Resource Abstraction?
5. Explain about Process Control?
6. Explain Operation in Operating system?

MODULE-II

Essay Questions:

1. Explain about Process Scheduling Algorithms in detail?
2. Explain about System view of the Process and Resources?
3. Explain about System Call in detail?

Short Questions:

4. Explain CPU Scheduling?
5. What is Thread? Explain Threading Issues in OS?
6. What is Process? Explain Process State diagram in OS?
7. Explain about Preemptive Scheduling Algorithm?

MODULE-III

Essay Questions:

1. Explain about Deadlock Detection and recovery?
2. Explain about Classical Process Synchronization problem?
3. Explain about Deadlock concept in detail?

Short Questions:

4. Explain about Procedure-Consumer problem?
5. Explain about Reader-Writer problem?
6. Explain about Semaphores?

MODULE-IV

Essay Questions:

1. Explain about Paging in Memory Management?
2. Explain about Segmentation and Memory Allocation Strategies?
3. Explain about Virtual Memory in detail?

Short Questions:

4. What is Virtual memory and explain its advantages?
5. Explain about Segmentation?
6. Write about Fixed and Variable Partitions?

MODULE-V

Essay Questions:

1. Explain about File Access Methods?
2. Explain Android Development Framework?
3. Explain Android Application Architecture?

Short Questions:

4. Write about File Operations?
5. Explain about File System in Android?
6. Explain about Security policy Mechanism in file system?

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- III(W.E.F. 2021-2022)

Course: Data Communications & Computer Networks

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week

Credits: 03

Objectives:

Emphasize the wired & wireless computer networks as a hybrid system to reflect the current trends of modern communications network architectures and techniques, instead of treating the wired networks and wireless networks separately, focus on both network architecture design and rigorous mathematical modeling techniques for performance analyses, rather than mainly on the network protocols specifications, integrate results of instructor's research and emerging techniques into the course topics to motivate students' research interests, not confined to traditional techniques.

Course Outcomes:

Students get familiar with various Network Reference Models, Protocols and issues involved in Wired and wireless networks.

MODULE - I

Introduction to Data communications: Network Criteria, point-to-point and multi point connection, physical topology, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Wireless Networks, protocols and standards.

Network Models: Layered tasks, Connection-Oriented and Connectionless Services, Service Primitives, The OSI Reference Model, The TCP/IP Reference Model, Comparison of the OSI and TCP/IP Reference Models, addressing.

MODULE – II

Physical Layer: Basis for Data Communication: Transmission of digital signals: Bit rate, bit length, baseband and broadband transmission, transmission impairment, data rate limits, performance, Guided Transmission Media Twisted Pair Coaxial Cable and Fiber Optics

Data Link Layer: Framing, Error Control, Flow Control, Error-Detection and correction: Introduction, Error detection using CRC. Data Link Protocols: Simplest Protocol, Stop-and-Wait Protocol, Stop-and-Wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ, HDLC.

MODULE – III

Multiple Accesses. Random Access: ALOHA, Carrier Sense Multiple Access (CSMA) Protocols, CSMA with Collision Detection, CSMA with Collision Avoidance..Controlled Access: Reservation, Polling and Token Passing. Channelization: FDMA, TDMA, CDMA.

Wired LAN: Ethernet, IEEE standards, Standard Ethernet. Changes in the standards, Fast Ethernet, Gigabit Ethernet, Wireless LAN (802.11).

MODULE - IV

Connecting LANs, Backbone and Virtual LANs: Connecting devices, Back bone Networks, Virtual LANs. **Network Layer:** Need for network layer, Logical addressing, Ipv4 addresses, Ipv6 addresses, Ipv4 and Ipv6 datagram's, Transition from Ipv4 to Ipv6.

MODULE - V

Network Layer: Delivery, Forwarding, Types of Routing protocols, Unicast Routing Protocols, The Transport Layer: Process to process Delivery, User Datagram Protocol (UDP) and TCP. Application layer: Domain name space, Distribution of name space, Resolution.

Text Books:

1. Data communications and Networking-4th edition Beharouza.Forouzan, TMH
2. Alberto Leon-Garcia, Communication Networks, 2012, Ninth Reprint, Tata McGraw-Hill, India.

Reference Books:

1. Data Communications and Computer Networks By Prakash C. Gupta, PHI Publishers.
2. Computer Networks By Andrew S.Tanenbaum, Pearson Education.
3. Wireless Technologies Circuits, Systems and Devices by Krzysztof Iniewski CRC Press.
4. Wireless Networking Technology: From Principles to Successful Implementation by Stephen A. Rackley.
5. Robert Gallager, Data Networks, 2010, 2nd edition, Prentice Hall, India.
6. W. Stallings, Data and Computer Communications, 2004, Prentice Hall, India.

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Problem-solving exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports like “Establishing a hybrid network protocol as per your college needs”.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)

II B.Sc (MEIOT)

SEMESTER-III

Course: Data Communications & Computer Networks

Time: 2.30Hrs

Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	2	30
Module-2	2	2	30
Module-3	2	1	25
Module-4	1	1	15
Module-5	1	1	15
Total No. of questions	8	7	
Total Marks Including choice			115

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2021-2022)

II B.Sc (MEIOT)
SEMESTER-III

Course: Data Communications & Computer Networks

Time: 2.30Hrs

Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
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2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL				115	TOTAL MARKS		60

$$115 - 60 = 55$$

$$\text{Percentage of choice given} = \frac{55}{115} \times 100 = 47.82\%$$

$$\frac{55}{115} \times 100 = 47.82\%$$

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- III(W.E.F. 2021-2022)

Course: Data Communications & Computer Networks

Time: 2:30hrs

SEMISTER – III

Max. Marks: 60

Section – A

Answer any 4 Questions (Short answer questions)

(4x5=20M)

1. Explain various types of networks?
2. What are the TCP/IP utilities?
3. What is the need for FRAMING?
4. Explain the difference between FDMA and CDMA?
5. Explain about transition from IPv4 to IPv6
6. Explain IEEE standards?
7. Explain the types of Routing protocols?

Section – B

Answer All Questions

(4x10=40M)

8. A) Explain the functions of various layers of OSI model?
(or)
B) Explain various Network topology
9. A) Explain GO-Back-N-ARQ
(or)
B) Explain the transmission of Digital Signals
10. A) What is Random access? Explain about CSMA/CD protocols?
(or)
B) Explain about wireless LAN (802.11)
11. A) Explain Back bone networks
(or)
B) Explain Domine Name Space and Distribution name space

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- III(W.E.F. 2021-2022)

Course: Wire and Wireless networks Lab

Practical /Laboratory-III

Time: 2 Hrs

Marks: 50

Practical/Laboratory – III

- | | |
|------------------------|----------|
| 1. Internal Practicals | 20 Marks |
| 2. External Practicals | 30 Marks |

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- III (W.E.F. 2021-2022)

Course: Wire and Wireless networks Lab

Practical /Laboratory-III

List of Experiments (NS2/QUALNET/BWSIM/MATLAB)

1. Study of Network Devices in detail
2. Study of Network IP and basic network command and network configuration commands
3. Wired and Wireless network scenario creation.
4. Simulation of Four Node Point To Point Network
5. Transmission Of Ping Message
6. Implement various Topologies
7. Study of Routing Protocols.
8. Study of performance of MAC Protocols
9. UDP and TCP Simulation
10. Call establishment in cellular network.
11. Handover in cellular network.
12. Study of Performance Comparison of TCP and UDP using NS – 2

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- III (W.E.F. 2021-2022)

Course: Data communications & Computer Networks

MODULE-I

Short:

1. Explain various types of networks
2. What are tcp/ip utilities?
3. Describe point-to-point and multi point connection
4. Advantages and disadvantages of wireless networks?

Essay:

1. Explain the functions of various layers osi model?
2. Explain various network topologies
3. Explain connection oriented and connectionless services

MODULE-II

Short:

1. What is the need for framing
2. Explain transmission impairment
3. Write about error control system
4. Write about flow control system

Essay:

1. Explain GO-BACK-N-ARQ
2. Explain error detection using crc
3. Explain the transmission of digital signals

MODULES-III

Short:

1. Explain carrier sense multiple access(CSMA)
2. Explain difference between FDMA & CDMA
3. Explain CSMA with collision detection
4. Explain IEEE standards

Essay:

1. What is random access? Explain about CSMA/CD protocols.

2. Explain fast ethernet, gigabit ethernet
3. Explain about wireless lan(802.11)

MODULE-IV

Short:

1. What is the need for network layer
2. Explain about transition from IPv4 to IPv6
3. Explain IPV4 logical addressing

Essay:

1. Explain IPv4 and IPv6 datagrams
2. Explain back-bone networks

MODULE-V

Short:

1. Explain the types of routing protocols
2. Write about how process to [rocess delivery
3. Explain unicast riuting protocols

Essay:

1. Explain domine name space and distribution name space
2. Explain tcp and udp

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- IV (W.E.F. 2021-2022)

Course: RFID and Wireless Sensor Networks

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week

Credits: 03

Course Objectives:

1. Understand and designing Radio frequency identification (RFID) systems, middleware architectures for real-world applications.
2. Understanding RFID and related Architectures, RFID Principles and security issues
3. Determine road map for transformation of flexible electronics from foils to textiles
4. Understanding the implementation, challenges and design constraints of WSN
5. Knowing about the MAC layer and routing protocols in WSN
6. Modeling of WSN for interfacing with IoT platform.
7. Knowing Security threats and resolution methods in WSN.

Course Outcomes

1. Students will be familiar with RFID technology, various components involved.
2. Getting familiar with various RFID standards, Students learn various Security issues involved in RFID.
3. Students learn about Wireless Sensor Networks
4. Familiar with WSN protocols routing algorithms.
5. Various Security issues involved in Wireless Sensor Networks.

MODULE-I

Introduction of RFID, Automatic Identification Systems, A Comparison of Different ID Systems, Components of an RFID System, Differentiation Features of RFID Systems, Transponder Construction Formats, Frequency, Range and Coupling , Active and Passive Transponders, Information Processing in the Transponder , Selection Criteria for RFID Systems, Fundamental Operating Principles.

MODULE-II

Frequency Ranges and Radio Licensing Regulations, Coding and Modulation, Data Integrity, Multi-Access Procedures – Anticollision, Security of RFID Systems, Attacks on RFID Systems

MODULE-III

Wireless Sensor Networks- Introduction, Challenges and Constraints, Applications, Node Architecture, Operating Systems, Physical Layer.

MODULE-IV

Medium Access Control: Characteristics of MAC Protocols in Sensor Networks, Contention-Free MAC Protocols, Contention-Based MAC Protocols, Network Layer: Various Routing Protocols.

MODULE-V

Security in WSN: Challenges of Security in Wireless Sensor Networks, Security Attacks in Sensor Networks, Protocols and Mechanisms for Security, IEEE 802.15.4 and ZigBee Security

Text Books

1. RFID Handbook, Klaus Finkenzeller, WILEY & SONS
2. Fundamentals of Wireless Sensor Networks: theory and practice by Walteneus Dargie, Christian Poellabauer

Reference Books

1. RFID and Sensor Networks Architecture, Protocols, Security and integration by Yan Zhang, Laurence T. Yang, Jining.
2. Ian F. Akyildiz, and Mehmet Can Vuran, Wireless Sensor Networks, 2010, Wiley, USA.
3. IBM Bluemix: The Cloud Platform for Creating and Delivering Applications, <http://www.redbooks.ibm.com/redpapers/pdfs/redp5242.pdf>
4. Wireless Sensor Networks Technology, protocols and applications by KAZEM SOHRABY, DANIEL MINOLI TAIEB ZNATI, JOHN WILEY & SONS, INC Publication.
5. REILLY, RFID Essentials By Bill Glover, Himanshu Bhatt.
6. W. Dargie and C. Poellabauer, Fundamentals of Wireless Sensor Networks, 2010, Wiley, USA.
7. Holger Karl and Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, 2011, Wiley, USA.

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Problem-solving exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports like “Design of RFID Smart Attendance cum Doorlock System for College Laboratory”.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,

Peers and self-assessment, outputs form individual and collaborative work

**P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)**

**II B.Sc (MEIOT) COURSE CODE:
SEMESTER-IV**

Course: RFID and Sensor Networks Time: 2.30Hrs Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	2	30
Module-2	2	2	30
Module-3	2	1	25
Module-4	1	1	15
Module-5	1	1	15
Total No. of questions	8	7	
Total Marks Including choice			115

**P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2020-2021)**

**IIB.Sc (MEIOT) COURSE CODE:
SEMESTER-IV**

Course: RFID and Sensor Networks

Time: 2.30 Hrs

Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL				115	TOTAL MARKS		60

$$115 - 60 = 55$$

$$\text{Percentage of choice given} = \frac{55}{115} \times 100 = 47.82\%$$

$$\frac{55}{115} \times 100 = 47.82\%$$

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)

Course: RFID and Wireless Sensor Networks

SEMISTER – IV

Time: 2:30hrs

Max. Marks: 60

Section – I

Answer any FOUR Questions

(4x5=20M)

1. Write about RFID.
2. What are the difference between active and passive Transponders
3. Explain coding and modulation in RFID
4. What is Data integrity
5. Explain challenges and constraints in WSN?
6. Discuss the Security in Wireless Sensor Networks?
7. Write the contention based MAC protocols

Section – II

Answer All Questions

(4x10=40M)

8. a) Explain fundamental operating principles of RFID
(or)
b) Explain features of RFID systems
9. a) Explain multi-access procedures in anti-collision?
(or)
b) Explain Node architecture?
10. a) Discuss the various Routing protocols in WSN
(or)
b) Explain characteristics of MAC protocols in WSN
11. a) Explain IEEE 802.15.4
(or)
b) Discuss the security attacks in sensor Networks

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)

Course: Network Simulator –3 Lab

Practical /Laboratory-IV

Time: 2 Hrs

Marks: 50

Practical/Laboratory – IV

- | | |
|------------------------|----------|
| 3. Internal Practicals | 20 Marks |
| 4. External Practicals | 30 Marks |

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)

Course: Network Simulator –3 Lab

Practical /Laboratory-IV

List of Experiments

1. Introduction to network simulators used for wireless Ad Hoc and Sensor Networks.
2. Introduction to TCL scripting: demonstration of one small network simulation script.
3. To study various trace file formats of network simulators.
4. To implement and compare various MAC layer protocols.
5. To implement and compare AODV and DSR routing algorithms in MANET
6. To implement DSDV routing algorithms in MANET
7. To implement signal strength based link management routing protocols.
8. To calculate and compare average throughput for various TCP variants
9. To implement and compare various routing protocols for wireless sensor networks

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)

Course: RFID and Wireless Sensor Networks

QUESTION BANK

Module-I

Short:

1. Write about RFID?
2. What are the difference between active and passive transponders
3. What are the features of RFID systems
4. What are the fundamental operating principals of RFID?

Essay:

5. Explain fundamental operating principals of RFID?
6. Describe the selection criteria for RFID systems
7. Explain features of RFID systems?

Module-II

Short:

1. Explain coding and modulation
2. Describe frequency range in RFID?
3. What is data integrity?
4. Describe radio licensing regulations?

Essay:

5. Explain multi-access procedures in anti-collision?
6. Write about attacks on RFID?
7. Describe the security of RFID systems

Module-III

Short:

1. Explain challenges and constraints in WSN?
2. Write about physical layer?
3. Explain different types of os?

Essay:

4. Describe the applications of wireless sensor networks
5. Explain NODE architecture

Module-IV:

Short:

1. Discuss the security in WSN?
2. Write about connection based MAC-protocols

3. Write about connection-free MAC protocols

Essay:

4. Discuss various routing protocols in WSN
5. Write about connection based & connection -free MAC protocols
6. Explain characteristics of MAC protocols

Module-V:

Short:

1. Write the connection based MAC protocols?
2. Explain zigbee security?
3. Describe the challenges of security in WSN?

Essay:

4. Explain IEEE 802.15.4
5. What are protocols and mechanisms for security
6. Discuss the security attacks in sensor networks

P R GOVT COLLEGE (A), KAKINADA

III B.Sc –MEIOT / Semester- IV (W.E.F. 2021-2022)

Course: Implementing IOT with Raspberry Pi

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week

Credits: 03

Course Objectives:

The course Objective:

1. This program aims to train students to be equipped with a solid theoretical foundation, systematic professional knowledge and strong practical skills in the Raspberry Pi.
2. The course focuses on higher-level operating systems, advanced networking, user interfaces, multimedia and uses more computing intensive IOT applications as examples using Raspberry Pi running Linux as the platform of choice
3. After doing this course, students should be able to design and deploy multiple IOT devices that could connect to the gateway.
4. Acquainting students with the basic web app creation
5. Connecting and Using various IOT Cloud Based Platforms such as Blynk, Thingspeak, AWS IOT, Google Cloud IOT Core etc..
6. Working with Big Data Processing Techniques
7. Developing Mobile App for IOT application

Course Outcomes:

At the end of the course the student should be able to

1. Appreciate the development technology for IOT
2. Familiar with Basic Concepts of Linux
3. Design real time IOT Devices.
4. Familiar with basic foundations of Python Programming and libraries
5. Comprehend the basic concepts of Mobile Cloud Computing
6. Develop a Mobile App for IOT applications.

MODULE-I

Getting Started with Raspberry Pi: Basic functionality of Raspberry Pi B+ board, setting up the board, configuration and use, implications of an operating system on the behavior of the Raspberry Pi as an IOT device, booting Raspberry Pi 3, Downloading an Operating System, format an SD card and booting the OS, Basics of Linux and its use, main features including navigating the file system and managing processes, text based user interface through the shell,

overview of the graphic user interface for Raspian Linux distribution.

MODULE-II

Interfacing Hardware with the Raspberry Pi, Raspberry Pi Remote Access, operate the Raspberry Pi in “headless mode”, Bash Command line, operating Raspberry Pi without needing a GUI interface.

Basics of the Python programming language, programming on the Raspberry Pi. Python on Raspberry Pi, Python Programming Environment, Python Expressions, Strings, Functions and Function arguments, Lists, List Methods, Control Flow.

MODULE-III

Communication with devices through the pins of the Raspberry Pi, RPi.GPIO library, Python Functions, setting up the pins, General purpose IO Pins, Protocol Pins, GPIO Access, applying digital voltages, and generating Pulse Width Modulated signals, Tkinter Python library, accessing pins through a graphic user interface

MODULE-IV

IOT Physical Servers and Cloud Offerings: Introduction to Cloud Storage models and communication APIs. Webserver – Web server for IOT, Cloud for IOT, Python web application framework. Designing a RESTful web API. Connecting to APIs

MODULE-V

IOT Design using Raspberry Pi IOT Applications based on Pi, LAMP Web-server, GPIO Control over Web Browser, Creating Custom Web Page for LAMP, Communicating data using on-board module, Home automation using Pi, Node-RED, MQTT Protocol, Using Node-RED Visual Editor on Rpi

Text books:

1. Simon Monk, “Programming the Raspberry Pi: Getting Started with Python”, January 2012, McGraw Hill Professional
2. The official raspberry Pi Projects Book https://www.raspberrypi.org/magpi-issues/Projects_Book_v1.pdf

Reference Books

1. Eben Upton and Gareth Halfacree, “Raspberry Pi User GUIde”, August 2016, 4th edition, John Wiley & Sons
2. Alex Bradbury and Ben Everard, “Learning Python with Raspberry Pi”, Feb 2014, JohnWiley & Sons
3. Michael Margolis, “Arduino Cookbook”, First Edition, March 2011, O'Reilly Media, Inc

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
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3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

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1. Group Discussion
2. Try to solve MCQ's available online.
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Some of the following suggested assessment methodologies could be adopted;

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2. Closed-book and open-book tests,
3. Problem-solving exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports like “Develop a Real time application like a smart home with following requirements: If anyone comes at door the camera module automatically captures his image send it to the email account of user or send notification to the user. Door will open only after user,,s approval.”.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)

II B.Sc (MEIOT) COURSE CODE:
SEMESTER-IV

Course: Implementing IOT with Raspberry Pi

Time : 2.30Hrs

Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	2	30
Module-2	2	2	30
Module-3	2	1	25
Module-4	1	1	15
Module-5	1	1	15
Total No. of questions	8	7	
Total Marks Including choice			115

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2020-2021)

II B.Sc (MEIOT) COURSE CODE:
SEMESTER-IV

Course: Implementing IOT with Raspberry Pi

Time: 2.30 Hrs

Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
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TOTAL				115	TOTAL MARKS		60

$$115 - 60 = 55$$

$$\text{Percentage of choice given} = \frac{55}{115} \times 100 = 47.82\%$$

P R GOVT COLLEGE (A), KAKINADA

I B.Sc –MEIOT / Semester- II(W.E.F. 2021-2022)

Course: Implementing IOT with Raspberry Pi

Time: 2:30hrs

SEMISTER – IV

Max. Marks: 60

Section – I

Answer any 4 Questions

(4x5=20M)

1. Write the basic functionality of Raspberry Pi B+ Board
2. Write a short note about Text based user interface through the shell
3. Explain Raspberry Pi remote access
4. Write some python expressions
5. Explain strings in Python
6. Discuss web server for IOT
7. How to create a web page for LAMP

Section – II

Answer All Questions

(4x10=40M)

8. A) how to Boot Raspberry Pi 3 & Explain?
(Or)
B) Write the features of LINUX OS
9. A) Explain operating Raspberry Pi without needing a GUI interface
(Or)
B) Explain function arguments in Python
10. A) Explain general purpose IO Pins & protocol pins
(Or)
B) Explain about accessing pins through a GUI
11. A) Explain cloud storage models
(Or)

B) Briefly discuss about LAMP web server.

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)

Course: Raspberry Pi Lab

Practical /Laboratory-IV

Time: 2 Hrs

Marks: 50

Practical/Laboratory – IV

- | | |
|------------------------|----------|
| 1. Internal Practicals | 20 Marks |
| 2. External Practicals | 30 Marks |

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- IV (W.E.F. 2021-2022)

Course: Raspberry Pi Lab

List of Experiments

1. Getting started with Raspberry Pi, Install Raspian on your SD card
2. Linux basic commands.
3. Coding simple programs in Python.
4. How to use Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device
5. How to have your Raspberry Pi interact with online services through the use of public APIs and SDKs
6. Understanding the connectivity of Raspberry-Pi with IR sensor. Write an application to detect obstacle and notify user using LEDs.
7. Design APP Using MIT App Inventor and Connect to Temperature Sensor

P R GOVT COLLEGE (A), KAKINAD

II B.Sc –MEIOT / Semester- IV (W.E.F. 2021-2022)

Course: Raspberry Pi Lab

QUESTION BANK

Module-I

Short:

1. Write the basic functionality of raspberrypi b+ board
2. Write a note about text based user interface through the shell
3. Describe basics of linux and its use?
4. Write how to format sd card and booting os in raspberrypi

Essay:

5. How to boot raspberrypi 3 and explain?
6. Explain features of linux os?
7. Explain text based user interface through the shell?

Module-II

Short:

1. Explain raspberrypi remote access?
2. Write some python expressions
3. Write function arguments in pi

Essay:

4. Explain operating raspberrypi without needing a GUI interface
5. Explain function arguments in python
6. Write about list methods and control flow in raspberrypi

Module-III

Short:

1. Explain strings in python
2. Explain pulse width modulation signals
3. Explain python functions

Essay:

4. Explain general purpose i/o pins & protocol pins.
5. Explain about accessing pins through a GUI

Module-IV

Shorts:

1. Describe web server for IOT

2. Explain python web application framework
3. Describe communication API's

Essay:

4. Explain cloud storage models
5. Explain designing a restful web API

Module-v

Short:

1. How to create webpage for LAMP
2. Write IOT applications based on raspberrypi
3. Explain communicating data using on-board module

Essay:

1. Briefly discuss about LAMP web server
2. Describe about message communication protocols

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc (CS)-SEMESTER-V
Paper- V: Data Base Management System

Course Objective:

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

Course Outcomes:

On completing the subject, students will be able to:

1. Design and model of data in database.
 2. Store, Retrieve data in database.
-

MODULE-I

Overview of Database Management System: Introduction, file-based system, Drawbacks of file-Based System ,Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management System, Classification of Database Management System, DBMS Approach, advantages of DBMS, data models, Components and Interfaces of Database Management System. Database Architecture, Situations where DBMS is not necessary.

MODULE-II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, **IS A** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition, entity clusters, connection types, advantages of ER modelling.

MODULE-III

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC). QBE

MODULE-IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operation, View, Sub Query, Embedded SQL,

MODULE-V

PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, Packages, Exceptions Handling, Database Triggers, Types of Triggers.

Reference Books

1. “Database System Concepts” by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010, 9780073523323
2. “Database Management Systems” by Raghu Ramakrishnan, McGrawhill, 2002,
3. Fundamentals of Relational Database Management Systems by S. Sumathi, S. Esakkirajan, Springer Publications
4. “An Introduction to Database Systems” by Bipin C Desai
5. “Principles of Database Systems” by J. D. Ullman
6. “Fundamentals of Database Systems” by R. Elmasri and S. Navathe

Student Activity:

- 1. Create your college database for placement purpose.**
- 2. Create faculty database of your college with their academic performance score**

P R GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc (CS)-SEMESTER-V
Paper-V: Data Base Management System

Time: 2 ^{1/2} Hrs

Marks:60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL MARKS				115	TOTAL MARKS		60

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc(CS)-SEMESTER-V
Paper-III: Data Base Management System

Time:2^{1/2}Hrs

Max. Marks:60

SECTION - A

Answer ANY FOUR questions

4 x 5M= 20M

1. Write about objectives of DBMS
2. Write about Data Independence
3. Write about attribute classification in ER Model
4. Explain fundamental relational algebra?
5. Explain about relational model
6. Explain about different data types in SQL
7. Write about cursor statement in PL/SQL

SECTION -B

Answer ALL questions

4 x 10M = 40M

8. a) Explain about advantages and disadvantages of DBMS
(OR)
b) Explain about components and interfaces of DBMS
9. a) What is E-R diagram? What are the building blocks of E-R diagram
(OR)
b) Explain about relational operators in relational algebra

10. a) Explain about DDL,DML,DCL statements in SQL
(OR)

b) Explain about views in details

11. a) Explain about loop control structures in PL/SQL?
(OR)

b) What is meant by a cursor? Explain about implicit and explicit cursors with examples

PR GOVT COLLEGE (A)::KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc(CS)-SEMESTER-V
Paper- III: Data Base Management System

Time: 2 1/2Hrs

Max. Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	2	30
Module-2	1	2	20
Module-3	1	1	15
Module-4	2	1	25
Module-5	2	1	25
Total No. of questions	8	7	
Total Marks Including choice			115

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc (CS)-SEMESTER-V
Paper- III: Data Base Management System

QUESTION BANK

MODULE-I

EASSY QUESTIONS:

1. Explain about characteristics of file-based system? Write about drawbacks of file-based systems?
2. Explain about advantages and disadvantages of DBMS?
3. Explain about of classification of DBMS?
4. Explain about components and interfaces of DBMS?
5. Explain the three-level architecture of data base system?

SHORT QUESTIONS:

6. Write about objectives of DBMS?
7. Write about roles and responsibilities of DBA?
8. Write about data Independence?

MODULE-II

EASSY QUESTIONS:

1. What do you mean by E-R-Model? Explain the degree of relationship in E-R-Model?
2. Write about generalization, specialization in E-R-Model?
3. What is E-R Diagram? What are the building blocks of E-R Diagram?

SHORT QUESTIONS:

4. Write about hierarchical data model?
5. Write about attribute classification in E-R model?
6. Write about classification of entity sets?

MODULE-III

EASSY QUESTIONS:

1. Explain about codd's relational data base rules ?
2. Explain about relational operators in relational algebra?
3. What is a Constrains? Explain different types of constrains in relational model?

SHORT QUESTIONS:

4. Explain about relation model?
5. What is Normalization? When it is used in RDBMS?
6. What is meant by a key? What are the different types of keys available in relational model?
7. Explain fundamental relational algebra?

MODULE-IV

EASSY QUESTIONS:

1. Explain DDL, DML, DCL in SQL?
2. Write about different joins in SQL?
3. Explain about views in SQL in detail?

SHORT QUESTIONS:

4. Explain about different data types in SQL?
5. Write about select statement with example?
6. Write about aggregate function in SQL?

MODULE-V

EASSY QUESTIONS:

1. Explain about PL/SQL block structure in detail.
2. Explain about loop control structures in PL/SQL.
3. What is meant by a cursor? Explain implicit and explicit cursors with examples.

SHORT QUESTIONS:

4. Write about trigger?

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc(CS)-SEMESTER-V
DATABASE MANAGEMENT SYSTEMS LAB

- a. Draw ER diagrams for train services in a railway station
- b. Draw ER diagram for hospital administration
- c. Creation of college database and establish relationships between tables
- d. Write a view to extract details from two or more tables
- e. Write a stored procedure to process students results
- f. Write a program to demonstrate a function
- g. Write a program to demonstrate blocks, cursors & database triggers.
- h. Write a program to demonstrate Joins
- i. Write a program to demonstrate sub queries
- j. Write a program to demonstrate of Aggregate functions
- k. Creation of Reports based on different queries
- l. Usage of file locking table locking, facilities in applications.

P. R. GOVT. COLLEGE (AUTONOMOUS), KAKINADA
SYLLABUS PAPER W.E.F.2020-2021

III B.Sc. (CS) V SEMESTER
SOFTWARE ENGINEERING - PAPER- VI

Course Objectives:

The Objective of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

Course Outcomes:

1. Ability to gather and specify requirements of the software projects.
 2. Ability to analyze software requirements with existing tools
 3. Able to differentiate different testing methodologies
 4. Able to understand and apply the basic project management practices in real life projects
 5. Ability to work in a team as well as independently on software projects
-

MODULE-I

INTRODUCTION: Software Engineering Process paradigms - Project management - Process and Project Metrics – software estimation - Empirical estimation models - Planning - Risk analysis - Software project scheduling.

MODULE-II

REQUIREMENTS ANALYSIS : Requirement Engineering Processes – Feasibility Study – Problem of Requirements – Software Requirement Analysis – Analysis Concepts and Principles – Analysis Process – Analysis Model

MODULE-III

SOFTWARE DESIGN: Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design.

MODULE-IV

USER INTERFACE DESIGN AND REAL TIME SYSTEMS :User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards.

MODULE-V

SOFTWARE QUALITY AND TESTING: Software Quality Assurance - Quality metrics - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Reverse Engineering and Re- engineering.

CASE tools –projects management, tools - analysis and design tools – programming tools - integration and testing tool - Case studies.

REFERENCE BOOKS

1. Roger Pressman S., “Software Engineering: A Practitioner's Approach”, 7th Edition, McGraw Hill, 2010.
2. Software Engineering Principles and Practice by Deepak Jain Oxford University Press
2. Sommerville, “Software Engineering”, Eighth Edition, Pearson Education, 2007
3. Pfleeger, “Software Engineering: Theory & Practice”, 3rd Edition, Pearson Education, 2009
4. Carlo Ghazi, Mehdi Jazayari, Dino Mandrioli, “Fundamentals of Software Engineering”, Pearson Education, 2003

Student Activity:

- 1. Visit any financial organization nearby and prepare requirement analysis report**
- 2. Visit any industrial organization and prepare risk chart.**

SEMESTER-V

SOFTWARE ENGINEERING-LAB

1. Studying various phases of Water-Fall Model.
2. Prepare SRS for Banking or On line book store domain problem
3. Using COCOMO model estimate effort for Banking or on line book store domain problem.
4. Calculate effort using FP oriented estimation model
5. Analyze the Risk related to the project and prepare RMMM plan.
6. Develop Time-line chart and project table using PERT or CPM project scheduling methods.
7. Draw E-R diagram, DFD, CFD and STD for the project.
8. Design of the test cases.
9. Prepare FTR. Version control and change control for software configuration item.

PROJECT & VIVA-VOCE

The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

The project is of 2 hours/week for V & VI semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The Project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2020-2021
III B.SC (CS) 2020-2023 BATCH
Course Code: CP6207
SEMESTER-V

SUBJECT: SOFTWARE ENGINEERING
PAPER- VI

Time: 2 1/2 Hrs
Max. Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL		15		115	TOTAL MARKS		60

$$115 - 60 = 55$$

$$\text{Percentage of choice given} = \frac{\quad}{115} \times 100 = \frac{55}{115} \times 100 = 47.82\%$$

$$115 \quad 115$$

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
III B.SC (CS) 2020-2023 BATCH
(Model paper W.E.F 2021-2022)

SEMESTER – V

Subject: Software Engineering

Time: 2 1/2 Hrs

Paper: VI

Max. Marks: 60

SECTION - A

Answer FOUR questions

4 x 5= 20 M

1. Explain about Software Project Scheduling?
2. Explain about Problem of Requirements?
3. Explain about Analysis process?
4. Explain about Cohesion and Coupling?
5. Write about Interface Standards?
6. Explain about Black Box testing?
7. Explain about Re-Engineering?

SECTION - B

Answer ALL questions

4 x 10= 40 M

8. a) Explain about Software Project Process and Metrics in detail?

(OR)

- b) Explain about Software Development Life Cycle?

9. a) Explain about the Software Architecture in detail?

(OR)

- b) Discuss about Software Requirement Analysis?

10. a) Explain about Data Flow Oriented Design?

(OR)

- b) Explain about Software Design Principles?

11. a) Describe the Human Computer Interaction and Computer Interface design.

(OR)

- b) Explain about Programming tools and Testing tools.

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR MODULE_WISE FOR THE YEAR 2021-22
III B.SC (CS) 2020-2023 BATCH
SEMESTER-V
Software Engineering

Time : 2.30 Hrs.

Max. Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
MODULE -I	2	2	32
MODULE -II	2	2	31
MODULE -III	2	1	26
MODULE – IV,V	2	2	26
Total No. of questions	8	7	
Total Marks Including choice			115

P.R. GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

QUESTION BANK FOR THE YEAR 2020-2021

**III B.SC (CS) SEMESTER-V
SOFTWARE ENGINEERING**

QUESTION BANK

MODULE-I

Essay Questions

1. Describe about the Project Management?
2. Explain about Software Project Process and Metrics in detail?
3. Explain about Software Engineering Process Paradigms?
4. Explain about Risk Analysis in Project Management?
5. Explain about Software Development of Life Cycle in detail?
6. Explain about Waterfall model?

Short Questions

7. Explain about Software Project Scheduling.
8. Explain about Software Project Planning?

MODULE-II

Essay Questions

1. Discuss about Software Requirement Analysis in detail?
2. Explain about Software Architecture in detail?
3. Explain about Feasibility Study?

Short Questions

4. Describe about Analysis Process?
5. Explain about Problem of Requirements?
6. Explain about Software Requirement processes?
7. Explain about Analysis Model?

MODULE-III

Essay Questions

1. Discuss the Data Flow oriented design?
2. Explain about Software Design Principles?
3. Explain about Architectural design in detail (or)
Explain about System Architecture in detail?

Short Questions

1. Explain about Cohesion and Coupling?
2. Explain about Architectural design?
3. Explain about Software Design and its objectives?

MODULE-IV

Essay Questions

1. Describe the Human Computer Interaction and Computer Interface design?
2. Explain about Computer Interface Design and Interface design?

Short Questions

3. Write about Interface Standards?
4. Explain about Computer Interface Design?
5. Describe various Human factors?

MODULE-V

Essay Questions

1. Explain about the Software Quality and Testing.
2. Discuss in detail about CASE tools in Software Engineering.
3. Explain the importance Validation and System Testing.
4. Explain about Programming tools and Testing tools
5. Explain in detail about Quality Assurance and Quality metrics.

Short Questions

6. Explain about Re-engineering
7. Explain about Black Box testing
8. Explain about Analysis Model

P.R.GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

III B.SC (CS) 2020-21

Course Code: CP6207

SEMESTER-V

Subject: Software Engineering

Credits: 02

Project Work : 50Marks

Internal Viva 15 Marks

External Viva 35 Marks

P.R.GOV.T.COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc (CS) Semester -VI
Paper-VII: Elective-A
Operating Systems

Course Objectives

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

Course Outcomes

1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
 2. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
 3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
-

MODULE - I

Operating System Introduction: Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating

Systems - Simple Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems, Operating System services.

MODULE - II

Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Case studies: Linux, Windows.

Process Coordination - Process Synchronization, The Critical section Problem, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

MODULE - III

Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table. Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames.

MODULE - IV

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Structure, Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling.

MODULE - V

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

REFERENCES BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press
3. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
5. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhare, TMH.
6. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
7. Operating Systems, A. S. Godbole, 2nd Edition, TMH

Student Activity:

- 1. Load any new operating system into your computer.**
- 2. Partition the memory in your system**
- 3. Create a semaphore for process synchronization**

Operating Systems Lab

Objectives:

- To use linux operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems

Outcomes:

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.

List of Experiments:

1.Usage of following commands

Ls,pwd,tty,cat,who,who am I,rm, mkdir, rmdir,touch,cd.

2. Usage of following commands

Cal,cat(append),cat(concatenate),mv,cp,man,date.

3. Usage of following commands

Chmod,grep,tput(clear,highlight),bc.

4. Write a shell script to check if the number entered at the command line is Prime or not

5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message “entered login name is invalid”
8. Write a shell script to display date in the mm/dd/yy format.
9. To implement the FCFS Algorithm.
10. To implement the shortest job First Algorithm.
11. To implement the priority algorithm.
12. To implement the round robin Algorithm.
13. To implement the FIFO page replacement algorithm

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2021-2022
III B.SC (CS) 2019-2022 BATCH
Course Code: CP6207

SEMESTER-VI

SUBJECT: OPERATING SYSTEMS

Time: 2 1/2 Hrs

PAPER- VII

Max. Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL		15		115	TOTAL MARKS		60

$$\text{Percentage of choice given} = \frac{115 - 60}{115} \times 100 = \frac{55}{115} \times 100 = 47.82\%$$

PR GOVT COLLEGE (A)::KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B. Sc(CS)-SEMESTER-VI
Paper-VII: Operating Systems (Elective-A)

Time:2 ½ Hrs

Max. Marks: 60

SECTION - A

Answer Any FOUR questions

4 x 5M= 20M

1. Define Operating System? Explain Functions of Operating System.
2. What are the differences between Real Time and typical Operating System?
3. Explain Process Control Block?
4. Explain about Semaphores?

5. What are the differences between Paging and Segmentation?
6. Explain Disk Scheduling.
7. Explain about Deadlock Avoidance.

SECTION – B

Answer ALL questions of the following

4 x 10M = 40M

8. a) Explain various types of Operating system?
(Or)
c) Explain the various operating system services?
9. a) Explain Preemptive Scheduling Algorithms?
(Or)
b) Explain about classic Problems of Synchronization?
10. a) Write about allocation of frames in Virtual Memory Management?
(Or)
c) Explain about Demanding Paging and Page Replacement Algorithm?
11. a) Explain about File Access Methods.
(Or)
b) Define Deadlock. Explain Deadlock characterization and methods for handling Deadlocks.

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR MODULE_WISE FOR THE YEAR 2021-2022
III B.SC (CS) 2019-2022 BATCH

Computer Science Course: Operating Systems
CODE: CP1204

Time : 2.30 Hrs.

SEMESTER-VI

Max. Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
MODULE -I	2	2	30
MODULE -II	2	2	30

MODULE -III	2	1	25
MODULE – IV,V	2	2	30
Total No. of questions	8	7	
Total Marks Including choice			115

**P.R. GOVT. COLLEGE (A), KAKINADA
III B.Sc(CS) (W.E.F 2020-2021)
QUESTION BANK**

Subject: Operating Systems

Paper: VII Elective-A

SEMESTER – VI

MODULE-I

Essay Questions:

1. Explain various types of Operating systems?
2. Explain the Structure of an Operating system?
3. Explain the features of an Operating system?
4. Explain the various Services of an Operating System?

Short Questions:

5. Define Operating System? Explain Functions of Operating System
6. What are the differences between Real Time and typical Operating System?

7. Explain Computer System Architecture?
8. How to manage software?
9. How can you get the security status of PC?

MODULE-II

Essay Questions:

1. Define processing and explain Process management?
2. Explain Preemptive Scheduling Algorithms?
3. Explain about classic Problems of Synchronization?
4. Explain Process Scheduling Algorithm?

Short Questions:

5. Explain CPU Scheduling?
6. Explain Process Control Block?
7. Explain about Semaphores?
8. What is Linux and explain its?
9. Explain Process State diagram?

MODULE-III

Essay Questions:

1. What is Virtual memory and explain its advantages and disadvantages?
2. Write about allocation of frames in Virtual Memory Management?
3. Explain about Demanding Paging and Page Replacement Algorithm?
4. Explain Direct Memory Access concept?

Short Questions:

5. What are the differences between Paging and Segmentation?
6. Explain Logical and Physical address space in memory?
7. Explain Paging and segmentation?
8. Write about fragmentation in memory management?
9. Write about allocation of frames in memory management?

MODULE-IV

Essay Questions:

1. Explain about File Access Methods?
2. Explain about File System Structure?
3. Explain about Disk Scheduling?

Short Questions:

4. What are the file operations?
5. Explain about Disk Scheduling?
6. Write about File Sharing and Protection?

MODULE-V

Essay questions:

1. Define Deadlock and explain in detail.
2. Define Deadlock. Explain Deadlock characterization and methods for handling Deadlocks.

Short questions:

3. Explain about Deadlock Avoidance?
4. Explain about Deadlock Prevention?

PR GOVT COLLEGE (A) :: KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III BSC (CS) -SEMESTER –VI

(Cluster 2) Paper-VIII: Elective – II (Cluster-C1)

Distributed Systems

Course Objectives

To expose the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission.

To discuss multiple levels of distributed algorithms, distributed file systems, distributed databases, security and protection.

Course Outcomes

Create models for distributed systems.

Apply different techniques learned in the distributed system.

UNIT I

Introduction to Distributed Computing Systems, System Models, and Issues in Designing a Distributed Operating System, Examples of distributed systems.

UNIT II

Features of Message Passing System, Synchronization and Buffering, Introduction to RPC and its models, Transparency of RPC, Implementation Mechanism, Stub Generation and RPC Messages, Server Management, Call Semantics, Communication Protocols and Client Server Binding.

UNIT III

Introduction, Design and implementation of DSM system, Granularity and Consistency Model, Advantages of DSM, Clock Synchronization, Event Ordering, Mutual exclusion, Deadlock, Election Algorithms.

UNIT IV

Task Assignment Approach, Load Balancing Approach, Load Sharing Approach, Process Migration and Threads.

UNIT V

File Models, File Accessing Models, File Sharing Semantics, File Caching Schemes, File Replication, Atomic Transactions, Cryptography, Authentication, Access control and Digital Signatures.

Reference Books

1. Pradeep. K. Sinha: “ Distributed Operating Systems: Concepts and Design ” , PHI, 2007.
2. George Coulouris, Jean Dollimore, Tim Kindberg: “ Distributed Systems” , Concept and Design, 3rd Edition, Pearson Education, 2005.

Student Activity

1. Implementation of Distributed Mutual Exclusion Algorithm.
2. Create a Distributed Simulation Environment.

Distributed Systems Lab

Objective:

It covers all the aspects of distributed system. It introduce its readers to basic concepts of middleware, states of art middleware technology

Outcomes:

1. Students will get the concepts of Inter-process communication
 2. Students will get the concepts of Distributed Mutual Exclusion and Distributed Deadlock Detection algorithm.
-
1. To study client server based program using RPC.
 2. To study Client server based program using RMI.
 3. To study Implementation of Clock Synchronization (Logical/Physical)
 4. To study Implementation of Election algorithm.
 5. To study Implementation of Mutual Exclusion algorithms.
 6. To write program multi-threaded client/server processes.
 7. To write program to demonstrate process/code migration.

PR GOVT COLLEGE (A):: KAKINADA

B.Sc(Computer Science)

III B.Sc Computer Science VI-Semester

MODEL QUESTION PAPER

Paper - VIII: Elective – II : (Cluster C) DISTRIBUTED SYSTEMS

Time : 2:30 Hours

Max.Marks:60

SECTION – A

Answer any **FOUR** of the following questions

4x5=20M

1. Write the Examples of Distributed Systems?
2. Write about Advantages of DS?
3. Explain about Client – Server binding?
4. Explain about Call Semantics?
5. Explain about Deadlock?
6. Write about Procee Migration?
7. Write about File Accessing models?

SECTION - B

Answer **ALL** the following questions.

4 x10 =40M

8. a) What is Distributed System? Explain about Different System Models.
(Or)
b) Describe the issues in Distributed Operating System.
9. a) Explain RPC Protocols?
(Or)
b) Explain about transparency in of RPC?
10. a) Explain about Implementation of DSM?
(Or)
b) Write about Election Algorithm.
11. a) Explain about Thread in Distributed System.
(Or)
b) Explain about Implementation of Distributed File System?

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA

MODEL BLUE PRINT FOR THE YEAR 2020-2021

III B.Sc Semester- VI

SUBJECT: (Cluster C) DISTRIBUTED SYSTEMS

Time: 2:30 Hrs

PAPER- VIII

Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	2	30
Module-2	2	2	30
Module-3	2	1	25
Module-4	1	1	15
Module-5	1	1	15
Total No. of questions	8	7	
Total Marks Including choice			115

PR GOVT COLLEGE (A)::KAKINADA
DEPARTMENT OF COMPUTER SCIENCE

III B.Sc(CS)-SEMESTER-VI
Paper - VIII: Elective – II : (Cluster C1) DISTRIBUTED SYSTEMS

Time: 2:30 Hrs

Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL		15		115	TOTAL MARKS		60

$$115 - 60 = 55$$

Percentage of choice given = $\frac{55}{115} \times 100 = 48.72\%$

$$\frac{55}{115} \times 100 = 48.72\%$$

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc (CS)-SEMESTER-VI

DISTRIBUTED SYSTEMS

QUESTION BANK

MODULE-I

Essay Questions

1. What is Distributed Computing System? Explain Issues in Designing a Distributed Operating System?
2. What is Distributed Computed System? Explain about examples of Distributed System?
3. What is Distributed System? Explain about Different System Models?

Short Questions

4. What about the disadvantages of DS over centralized systems?
5. Write about disadvantages of DS of Distributed systems?
6. Write the Examples of Distributed Systems?
7. Write about Advantages of DS?

MODULE-II

Essay Questions

1. Explain about features of Parameter passing in RPC?
2. What is RPC? Explain how RPC works?
3. Explain RPC Protocols?
4. Explain about transparency in of RPC?

Short Questions

5. Explain about parameters passing in RPC?
6. Explain about Client – Server binding?
7. Explain about Call Semantics?

MODULE-III

Essay Questions:

1. What is DSM? Explain several kinds of Shared Memory Multiprocessors?
2. Write about Election Algorithm?
3. Explain about Clock Synchronization Algorithm?
4. Explain about Implementation of DSM?

Short Questions

5. Write the advantages of DSM?
6. Write about Deadlocks in DS?

MODULE-IV

Essay Questions

1. Describe the Following in Distributed Systems?
 - a. Task Assignment Approach
 - b. Load-Balancing Approach
2. Describe about Load Sharing Approach & Process Migration in DS?
3. Explain about Thread in Distributed System.

Short Answer Questions

4. Explain Threads in DS?
5. Write about process migration?

MODULE-V

Essay questions

1. Explain about Implementation of Distributed File System?

Short Questions

2. Write about Atomic Transactions in Distributed systems?
3. Write about File Accessing models?

PR GOVT COLLEGE (A) :: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III BSC (CS) -SEMESTER –VI
(Cluster 2) Paper-VIII : Elective II(Cluster –C2)

Cloud Computing

Course Objectives:

The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms.

Course Outcomes

1. Compare the strengths and limitations of cloud computing
 2. Identify the architecture, infrastructure and delivery models of cloud computing
 3. Apply suitable virtualization concept.
 4. Choose the appropriate cloud player , Programming Models and approach.
 5. Address the core issues of cloud computing such as security, privacy and interoperability
 6. Design Cloud Services and Set a private cloud
-

Unit 1

Cloud Computing Overview – Origins of Cloud computing – Cloud components - Essential characteristics – On-demand self-service , Broad network access , Location independent resource pooling , Rapid elasticity , Measured service

Unit II

Cloud scenarios – Benefits: scalability , simplicity , vendors ,security. Limitations – Sensitive information - Application development – Security concerns - privacy concern with a third party - security level of third party - security benefits Regularity issues: Government policies

Unit III

Cloud architecture: Cloud delivery model – SPI framework , SPI evolution

Software as a Service (SaaS): SaaS service providers – Google App Engine, Salesforce.com and google platform – Benefits – Operational benefits - Economic benefits

- Evaluating SaaS **Platform as a Service (PaaS):** PaaS service providers –Salesforce.com
- Services and Benefits

Unit IV

Infrastructure as a Service (IaaS): IaaS service providers – Amazon EC2 , GoGrid —

- Benefits

Cloud deployment model : Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing

Unit V

Virtualization: Virtualization and cloud computing - Need of virtualization – cost , administration , fast deployment , reduce infrastructure cost - limitations

Types of hardware virtualization: Full virtualization - partial virtualization - para virtualization

Desktop virtualization: Software virtualization – Memory virtualization - Storage virtualization – Data virtualization – Network virtualization **Microsoft Implementation:** Microsoft Hyper V – Vmware features and infrastructure – Virtual Box - Thin client

Reference Books

1. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter TATA McGraw- Hill , New Delhi - 2010
2. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
4. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madiseti, University Press
5. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammarai selvi, TMH

Student Activity:

1. Prepare the list of companies providing cloud services category wise.
2. Create a private cloud using local server

Cloud Computing Lab

Outcomes: Learner will be able to...

1. Appreciate cloud architecture
2. Create and run virtual machines on open source OS
3. implement Infrastructure , storage as a Service.

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.

2. Find procedure to attach virtual block to the virtual machine and check whether it holds the

data even after the release of the virtual machine.

3. Install a C compiler in the virtual machine and execute a sample program.

4. Show the virtual machine migration based on the certain condition from one node to the other.

5. Find procedure to install storage controller and interact with it.

1. Introduction to cloud computing.
2. Creating a Warehouse Application in Sales Force.com.
3. Creating an Application in Sales Force.com using Apex programming Language.
4. Implementation of SOAP web services in C#/ JAVA Applications.
5. Implementation of Para- Virtualization using VM ware's workstation/ Oracle's Virtual Box and Guest O.S.

PR GOVT COLLEGE (A):: KAKINADA

DEPT OF COMPUTER SCIENCE

B.Sc (Computer Science)

III B.Sc Computer Science VI-Semester

MODEL QUESTION PAPER

Paper - VIII : Elective – II : (Cluster - B1) CLOUD COMPUTING

Time : 2 ½ Hours

Max.Marks:60

SECTION – A

Answer any **FOUR** of the following questions

4x5=20M

1. Explain the origins of cloud computing?
2. Explain regularity issues in cloud computing?
3. Explain about Google platform?
4. Write about various SaaS providers
5. Explain about Amazon EC2?
6. What is virtualization? What is the need for virtualization?
7. Explain about thin client?

SECTION - B

Answer **ALL** the following questions.

4x10 =40M

8. What is Cloud Computing? Explain the components of Cloud Computing
(OR)

Explain various essential characteristics of cloud computing?

9. Explain .various cloud scenarios?

(OR)

Explain the benefits and limitations of cloud computing?

10. Explain about SPI framework?

(OR)

Explain various cloud deployment models?

11. What is virtualization? Explain the benefits and limitations of virtualization?

(OR)

Explain IAAS in detail?

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA

MODEL BLUE PRINT FOR THE YEAR 2020-2021

III B.Sc Semester- VI

**SUBJECT: CLOUD COMPUTING (Elective-B)
PAPER- VIII**

**Time:2 ½ Hrs
Marks: 60**

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
Module-1	2	1	25
Module-2	2	1	25
Module-3	1	2	20
Module-4	2	1	25
Module-5	1	2	20
Total No. of questions	8	7	
Total Marks Including choice			115

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc (CS)-SEMESTER-VI
Paper-VIII: CLOUD COMPUTING (Elective-B)

Time: 2 ½ Hrs

Marks:60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	7	5	35	4	5	20
2	Section-B Essay Questions	8	10	80	4	10	40
TOTAL MARKS				115	TOTAL MARKS		60

$$115 - 60 = 55$$

$$\text{Percentage of choice given} = \frac{\quad}{115} \times 100 = \frac{55}{115} \times 100 = 47.85\%$$

$$115 \qquad 115$$

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc (CS)-SEMESTER-VI
Paper-VIII: CLOUD COMPUTING (Elective-B)

QUESTION BANK

MODULE – 1

Short Questions:

1. Explain the origins of Cloud Computing?
2. Explain about Rapid Elasticity?

Essay Questions:

1. What is Cloud computing? Explain the components of Cloud computing?
2. Explain various essential characteristics of Cloud Computing?
3. Briefly Explain (i) On demand self service (ii) Broad network access.

MODULE – 2

Short Questions:

1. What are the regularity issues in Cloud Computing?
2. What are the security concerns in Cloud computing?

Essay Questions:

1. Explain various Cloud Scenarios?
2. What are the Benefits and Limitations of Cloud Computing?
3. Briefly Explain about Government policies in Cloud computing?

MODULE – 3

Short Questions:

1. Briefly Explain about SAAS providers?
2. Briefly explain about Google platform?

Essay Questions:

1. Explain about SPI frame work?
2. Write a note on the SAAS providers
i)Google App Engine ii) Salesforce.com
3. Explain about PAAS in detail?

MODULE – 4

Short Questions:

1. Explain about Amazon EC2?
2. Briefly Explain about Go Grid?

Essay Questions:

1. Explain various Cloud deployment models?
2. What are the advantages and disadvantages of cloud computing?
3. Explain about IAAS in detail.

MODULE – 5

Short Questions:

1. Write about thin client?
2. What is Virtualization? What is the need of Virtualization?

Essay Questions:

1. Explain about Hardware Virtualization in detail?
2. What is Virtualization? Explain the benefits and limitations of Virtualization?
3. What is VM Ware? Explain about VM Ware Infrastructure.

P.R. GOVERNMENT COLLEGE(A), KAKINADA
B.Sc. Computer Science: Project

Guidelines and Evaluation pattern of the Project of the Cluster

The student who wants to do the project should follow the following.

1. Select the topic with clear Aim & objectives.
2. Collect the previous information regarding the topic.
3. Student has to get the clear idea after getting the reference material ,i.e., how to proceed and what to do (methodology).
4. Before going to discuss the topic, every student has to do at least two Seminars on the chosen topic.
5. Finally student has to come with Results & Conclusions.
6. Bibliography (Reference Journals/books should be mentioned).
7. Total hours allotted or 5hrs per week(2hrs literature survey –library+3hrs lab)
8. . A group of 4 students can take a project

Seminars 50 Marks	Report of the project : 50Marks	Project Viva voce 50 Marks	
1. Seminar 1 after 30 days(25 M) 2. Seminar 2 after 60 days(25 M)	1. Introduction (Selection of the topic, Aim & objectives) 2. Review of Information 3. Methodology 4. Analysis & Discussion 5. Suggestions & Conclusion		