PITHAPUR RAJAH'S GOVT. COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

INFORMATION TECHNOLOGY

BOARD OF STUDIES

2025-2026

PROCEEDINGS OF THE PRINCIPAL (FAC), PITHAPUR RAJAH's GOVT. COLLEGE [A], KAKINADA
Present: Dr. Kandula Anjaneyulu, M.A, Ph.D.

Rc.No.9/A.C/BOS/2025-26 **Dt.31 July 2025**

Sub: Pithapur Rajah's Government College[A] Kakinada--Academic Cell- Conduct of BOS Meetings for the Academic Year 2025-26 - Guidelines issued - Regarding.

ORDER:

The autonomous colleges, in alignment with their vision, mission, stated objectives, and core values, are mandated to design and develop their own outcome-based curricula. This must be done with due consideration for societal, local, and global industry requirements, employability, and the development of industry-ready and transferable skills. Accordingly, every programme shall prescribe Course Outcomes (COs), Programme Outcomes (POs), and Programme Specific Outcomes (PSOs) along with a suitable learning outcome assessment management system, supported by a robust and transparent evaluation mechanism to measure attainment levels among students.

Further, the A.P. State Council of Higher Education (APSCHE) has introduced a revised curricular framework effective from the Academic Year 2025-26, incorporating Skill Enhancement Courses, Multi-Disciplinary courses, the Indian Knowledge System and a revised credit structure.

Our institution, from the Academic Year 2022–23 onwards, has defined a renewed vision and mission along with updated objectives and core values, necessitating the design and reorientation of its academic and research administration in line with these directives.

In light of the above responsibilities prescribed by the institution's vision and mission, NEP–2020, NAAC, NIRF, and the APSCHE's revised and new UG and P.G. curricular framework, it is imperative to customize, design, and re-orient our academic and research activities to meet the expectations of students, industries, and government stakeholders.

Accordingly, the Chairpersons of the U.G and P.G Boards of Studies (BoS) of various departments are hereby requested to make necessary arrangements to convene their BoS meetings before **09 Aug 2025**.

The Chairpersons are further instructed to:

1. Prepare the curricula and extracurricular activities for the Academic Year 2025–26 in line with the institution's vision, mission, NEP–2020, and NIRF norms.
2. Devise an appropriate evaluation system to ensure effective learning outcomes and holistic student development.
3. Ensure that the curriculum design includes a mandatory *20% revision* of the syllabus each year without deviating from the APSCHE prescribed syllabus.
4. If the syllabus is not prescribed by APSCHE/Affiliating University, then the syllabus is to be

framed by the BOS committee concerned with duly following the mandate prescribed above.

5. Engage stakeholders viz employers, parents, and alumni, to obtain feedback on the existing curricula and to invite suggestions for improvements.
6. Invite the University nominee, subject experts, industry representatives, student representatives, and parent representatives well in advance. The meeting notice shall clearly specify the date, venue, and agenda, and a soft copy of the agenda and relevant documents shall be circulated for their perusal.
7. Ensure that the subject experts invited preferably hold a Doctorate with at least 10 years of teaching experience and have relevant expertise in designing industry-related, market- and job-oriented curricula.
8. Facilitate thorough deliberations on curriculum design, evaluation methods, incorporation of research components, measures to enhance learning experiences, and optimal utilization of existing human, physical, and ICT resources.
9. Conduct all BoS meetings in offline mode. Online participation shall be permitted only under exceptional circumstances.
10. Prescribe benchmarking and quality initiatives in pedagogy and learning, including strategies for curriculum design and teaching-learning processes, in collaboration with the IQAC Coordinator, prior to the BoS meeting.
11. Ensure that a minimum student attendance of **75%** shall be required for eligibility to appear for I & II Mid-Term Examinations under the CIA component; this shall be formally approved in the BoS meeting.
12. Approve any new programmes to be introduced for the Academic Year 2025–26, the number and frequency of certificate courses, and SWAYAM MOOCs courses.
13. Submit the approved BOS copies in the prescribed format, in **quadruplicate (hard copies)** to the Academic Cell for onward submission to the IQAC, Examination Cell, and Library, within **three days** of the meeting and upload the soft copy in their respective department web pages in the college website.
14. Ensure strict alignment of all recommendations and curriculum changes with the institution's vision and mission.
15. Submit a request to receive advance funds from the Examination cell through Principal for conducting BoS meetings.

Following contents shall be presented in the BOS document in the order

1. Proceedings of the Principal pertaining to BOS
2. Composition of BOS
3. Vision and Mission of the department
4. Agenda: It shall include ATR on the previous BOS meeting first, resolutions, etc., later.
5. Table showing the Allocation of Credits in the following table for both theory and Practicals' in case of science subjects

S. No	Semester	Title of the Course (Paper)	Hrs./week	Max. Marks (SEE)	Marks in CIA	Credits
1	III	Physical Chemistry-1	3	50	50	4

6. Resolutions adopted in the meeting with detailed discussion that took place during the meeting.
7. Each BOS Chairman shall, immediately after syllabus, tabulate the changes made in the syllabus/ paper along with justification.
8. Attendance of Members present with signatures in the tabular form.
9. List of Examiners & Paper setters (Minimum 20 members and at least 02 members from other states)
10. Syllabus for each course (both theory & Practical in case of Science subjects) followed by model question papers (theory & practical) and allocation of CIA (50marks) for each course with structure.
11. Each student (2025-26 AB) has to complete one MOOCS course from SWAYAM in any subject per year.

CIA structure for Single Major system

- Out of 50 marks for CIA, 25 marks are allocated for Mid examinations. In each semester two mid examinations to be conducted and the average of the two will be considered.
- Mid examinations are to be conducted in offline mode at college level
- Mid examination to be conducted in offline mode in which the student should attempt **one essay** question for ten marks out of two questions, **three short** answer questions with five marks each out of five questions
- The remaining 25 marks for CIA are allocated as per the following structure.

Project-10M	Seminar- 5M	Assignment- 5M	Viva on theory- 3M	Clean & green and Attendance- 2M

BOS COMPOSITION

PROCEEDINGS OF THE PRINCIPAL (FAC), P.R. GOVERNMENT COLLEGE (A), KAKINADA

Present: Dr. Kandula Anjaneyulu, M.A, Ph.D.

R.C.No.2/A.C/BOS - Members Nomination/2025-26 **Dated: 04.08.2025**

SUB: P.R. Government College (A), Kakinada- UG Board of Studies (BOS)- Nomination of Members - Orders issued.

REF: Proc.RC.No.1/A.C/BOS/2025-26 dated: 31 July 2025 of the Principal, Pithapur Rajah's Government College(A) Kakinada.

ORDER:

The Principal, P.R. Government College(A), Kakinada is pleased to constitute UG Boards of Studies in **B.Sc. Information Technology** for framing the syllabi in respective Subject for all semesters duly following the norms of the UGC Autonomous guidelines.

S. No	Name of the Person	Designation
1	Smt P.Jyothi	Chairman & Lecturer Incharge, Department.
2	Smt. N.Naga Subrahmanyeswari, ASD College for Women (A), Kakinada	University Nominee
3	Sri. R.V. Phani Kumar, GDC Perumallapuram	Subject Expert-1
4	Dr.M.Rajababu, Associate Professor,Dept. of IT, Aditya University, Surampalem	Subject Expert-2
5	P.Swamy Vandanam	Representative from Industry
6	Mr. K.Aswith Prem	Member
7	Ms. N.Sravani Devi	Member
8	Ms. S.Devi Prasanna	Member
9	Ms. P.V.Maheswari	Member
10	Ms. K.Sravani Devi	Member
11	Mr. K.Nani	Member
13	P.Asha Jyothi	Student Alumni Member
14	R.Pavani Priya	Student Member
15		Student Member

The above members are requested to attend the BoS meeting on 07-08-2025 FN and share their valuable reviews, and suggestions on the following functionaries.

- Prepare syllabi for the subject keeping in view the objectives of the college and interest of the stake holders for consideration and approval of the IQAC and Academic Council.
- Suggested methodologies for innovative teaching and evaluation techniques.
- Suggest the panel of Names to the academic council for appointment of Examiners.
- Coordinate research, teaching, extension and other activities in the Department.

5/8/25

PRINCIPAL

P. R. Government College(A), Kakinada

Dr. Kandula Anjaneyulu
M.A.,UGC.NET,JRF,Ph.D.
PRINCIPAL (FAC)
P.R.GOVERNMENT COLLEGE (A)
KAKINADA-533 001

The Chairpersons of all Boards of Studies are hereby instructed to comply with these directives in letter and spirit to ensure the highest standards of academic and administrative excellence.

PRINCIPAL
P.R. Govt. College (Autonomous)
KAKINADA-533 001.

PRINCIPAL
Pithapur Rajah's Government College(A)
Kakinada

Copy to:

1. Lecturers-in-Charge (BOS Chairmen) of all the departments
2. Academic Coordinator
3. IQAC coordinator
4. Controller of Examinations
5. Office

DEPARTMENT OF COMPUTER APPLICATIONS

Vision:

Department of Computer Applications Strives rigorously to provide quality education in both theoretical and applied foundations of computers and train the students to solve the real world problems effectively thus enhancing their potential for high quality careers.

Mission:

- To produce students with critical thinking and lifelong learning capabilities for applying their knowledge to uplift the living standards of the society.
- To equip students and faculty with excellent teaching-learning capabilities through advanced learning tools and technologies.
- To produce students with enriched skill set, professional behaviour, strong ethical values and leadership capabilities so as to work with commitment for the progress of the nation.

PSO's:

PSO 1: Students will improve their computer literacy, their basic understanding of operative systems and a working knowledge of software commonly used in academic and professional environments

PSO 2: Students will learn to organize information efficiently in the forms of outlines, charts , etc. using appropriate software.

PSO 3: Students will acquire skills for designing and delivering an effective presentation and developing the various IT skills to electronic databases.

PSO 4: Students will be able to design and implement a website.

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PSO 5: Students will be able to perform E-Banking , E-Marketing, E-Learning , E-Shopping.

The third meeting of Board of Studies ***INFORMATION TECHNOLOGY*** has been conducted in the Department of Computer Applications on 07th Aug, 2025 at 1:30.PM to discuss the following.

Agenda

1. To approve the curriculum, blue print and model paper for 1ST year B.Sc Information Technology Major Course under CBCS based as per the directions of the APSCHE for the admitted batch 2025 -26 (I & II Semesters) (Syllabus as per APSCHE)
2. To approve the curriculum, blue print and model paper for 2nd year B.Sc Information Technology Major Course under CBCS based under the directions of the APSCHE for the admitted batch 2024 - 25(III & IV Semesters) To approve the curriculum, blue print and model paper for 3RD year B.Sc Information Technology, under CBCS based under the directions of the APSCHE for the admitted batch 2023 -24 (V & VI Semester)
3. To approve the Two Certificate Courses for Information Technology students were introduced in this academic year.
4. To approve the incorporation of additional inputs to various courses (where ever it is felt necessary) for enhancing students understanding over the concerned course and this shall not be considered for evaluation purpose.
5. To approve the Examination procedure for the courses for I, II, III years of B.Sc Information Technology (2025 – 26, 2024-25 & 2023-24 admitted batches).
6. To approve the Scheme of Valuation for Practical's
7. Every Student has to complete one MOOC's course per year. And the Student award two extra credits to who have registered and completed SWAYAM course successfully.
8. To award 4 credits for each first year Community service project (CSP) , and second year Internship between 1st and 2nd year and 2nd and 3rd year (two summer vacations for Apprenticeship during 6th semester)
9. To implement pedagogical strategies to enrich teaching and learning process.
10. To approve the proposed departmental activities for 2025-26.
11. To approve the list of examiners and paper setters for the academic year 2025-26.
12. Mandatory attendance of 60% for I mid examinations, 75% of attendance for II mid examination and 75% attendance for SEE – theory and practical.
13. Introducing of New Courses of Study and the possibilities
14. Any other item with the permission of the chair.

CHAIRMAN
BOARD OF STUDIES

Resolutions taken:

The following resolutions are approved by university nominee and all the members of BOS After reviewing the existing titles and contents of class I,II,III,IV and V framed by APSHE, a the board come out with the following resolutions.

Resolution – I

It is resolved to approve the following changes of course I,II of Information Technology as it is given by APSCHE as a part of this, from the academic year as, NEP 2020, the Major and minor policy system has come into effect.

It is resolved to approved the curriculum, blue print and model paper for 1st year B.Sc(Information Technology) Course under CBCS based as per the directions of the APSCHE for the admitted batch 2025 -26. (I Semester)

1st year : 1st sem – major(2)

1st year : 2nd sem – major(2)

Question Paper Model Pattern

Major

Section-I

Part-A : Given 3 questions

Part-B : Given 3 questions

Write any three questions, at-least one question from each part each question carries 10 marks

Section-II

Write any Four questions out of seven questions each question carries five marks.

Resolution – II

It is resolved to approve the syllabus for 2nd and 3rd year of B.Sc Information Technology as it is given by APSCHE as a part of this, from the academic year as, NEP 2020, the Major and minor policy system has come into effect. According to this

2nd year- IIIrd sem total subjects are: 4 -Major and 1-Minor

2nd year -IVth sem total subjects are: 3 -Major and 2-Minor.

3nd year- Vth sem total subjects are: 4 -Major and 2-Minor

Question Paper Model Pattern

Major Subject

Section-I

Part-A : Given 3 questions

Part-B : Given 3 questions

Write any three questions, at-least one question from each part each question carries 10 marks

Section-II

Write any Four questions out of seven questions each question carries five marks.

Resolution – III:

It is resolved to introduce certificate course with the Name **Basic Computer Applications** (30 hours) as per the requirement, possibility and feasibility, another certificate course name is **Emerging and Advanced Technologies.**

Resolution – IV

It is resolved to approved the incorporation of additional inputs to various courses (where ever it is

felt necessary) for enhancing students understanding over the concerned course and this shall not be considered for evaluation purpose.

Resolution – V

a) Each theory subject is evaluated for 100 Marks (I, II&III Years) out of which 50 Marks through semester end examination for I, II & III year, 50 marks for internal assessment.

b) The minimum pass mark for both internal and external examinations is 18 marks (36%), but as a whole student is subjected to get 40% marks (40 out of total 100 marks) to pass the subject. (I, II&III Years)

c) **CIA structure for Single Major system**

- Out of 50 marks for CIA, 25 marks are allocated for Mid examinations. In each semester two mid examinations to be conducted and the average of the two will be considered.
- I mid examination is to be conducted in offline mode at college level and II mid examination is to be conducted in online mode at department level.
- I mid examination to be conducted in offline mode in which **one essay** question for ten marks out of two questions, **two short** answer questions with five marks each out of four questions and five objective questions to be given for each paper.
- The remaining 25 marks for CIA are allocated as per the following structure.

Project 10M	viva on theory- 3M	assignment- 5M	Seminar- 5M	clean & green and Attendance- 2M

d) Internal assessment for 50 Marks is as follows: (For Certificate Courses)

vii) Study Project : 20 Marks

viii) Student Seminar : 10 Marks

ix) Viva-voce : 10 Marks

x) Assignment : 10 Marks

Resolution – VI

it is resolved to set the Scheme of Valuation for Practical's

- Record - 10 Marks
- Viva voce - 10 Marks
- Test - 30 Marks
- Total - 50 marks

Resolution – VII

It is resolved to give extra credits for MOOCS courses, N.S.S., N.C.C., winners of zonal level sports and games competitions, participation in state level/ National level competitions, blood donations camps, environmental programs like extending services in facing the natural calamities etc.

Resolution – VIII

It is resolved to adopt Community Service Project for all the students at the end of Sem–II. Resolved to send all the final year students for on job training apprenticeship in connection with industries for off- site Project in the end of Sem V/VI with the industries in accordance with their interest of study.

Resolution – IX

It is resolved to implement pedagogical strategies to enrich teaching and learning process.
It is Resolved to conduct International / National , Webinar / Seminar like Data Science, etc.,
It is Resolved to conduct extension lectures by the eminent persons.

Resolution – X:

It is resolved to approve the proposed departmental activities for 2024-25.

Resolution – XI:

It is resolved to approve the list of examiners and paper setters for the academic year 2024-25.

Resolution – XII

Streamlining of regularity in attendance. Resolved to make the eligibility to appear for 1st mid is 75% of attendance for the2nd mid it would be 75% , for 75% of attendance for semester examination and 90% for practical examinations .Also it is resolved that the student should attend at least one internal exam to appear for the Semester end examination.

Resolution – XIII

It is Resolved to introduce new courses of study whenever necessary.

Resolution – XIV

It is Resolved to follow the admission criteria for the programmes offered by the department.

It is resolved to arrange a field trip.

MEMEBERS PRESENT

S.No	Name of the Person	Designation	Signature
1	Smt. P.Jyothi	Chairman & Lecturer Incharge, Department.	P.J 7/8/25
2	Srí.N.Naga Subrahmanyeswari, Lecturer in Computer Science, ASD Govt Degree College for Womens (A) KAKINADA	University Nominee	N.N.S.Eswari 7/8/25
3	Sri. R.V.Phani Kumar, Lecturer In Computer Applications GDC Perumallapuram.	Subject Expert -1	7/8/25
4	Dr. M. Rajababu, Associate Professor, Dept of IT, Aditya University Surampalem.	Subject Expert -2	
5	Sri. P.Swamy Vandanam, M.D BDPS Computers, KAKINADA	Representative from Industry	7/8/25
6	Sri. K.Aswithprem Lecturer in Computer Applications	Member	K. Aswithprem
7	Ms. N.Sravani Devi Lecturer in Computer Applications	Member	
8	Ms. S.Devi Prasanna Lecturer in Computer Applications	Member	
9	Ms.P.V.Maheswari Lecturer in Computer Applications	Member	P.V.M
10	Ms. K.Sravani Devi Lecturer in Computer Applications	Member	K.Sravani
11	Mr. K.Nani Lecturer in Computer Applications	Member	K. Nani
12	A.Ashok	Alumni Member	
13	R.Pavani Priya	Student Member **III B.Sc - IT**	R.Pavani Priya
14	A. Bala Durga Swaroop	Student Member **III B.com-CA**	A.Bala Durga Swaroop
15	M.Shivani	Student Member **II B.com-CA**	M.Shivani

Department of Computer Applications

PANEL OF NAMES FOR APPOINTMENT OF EXAMINERS/PAPERSETTERS

2025-26

S.No	NAME & DESIGNATION	COLLEGE	EXPERIENCE	Address
1.	**Smt S.Vaani Kumari**	Govt. Degree College(W) (A) , Srikakulam e-mail: vanikumari.s@gmail.com Ph:9885766144	7 Years	C/o college
2.	**Smt B.Lakshmi**	SKR GDC, Gudur, Email: Ph:7893204741	7 Years	C/o college
3.	**Smt. J. Sharmila Rani**	GDC, Gajapathinagaram, Vijayanagaram Dt, AP Email: sharmilarani.j@gmail.com Ph:8341548582	7 Years	C/o college
4.	**Smt K.Adilakshmi**	GDC Tiruvuru e-mail: computerdeptmpl@gmail.com Ph:9440027500	7 Years	C/o college
5.	**Smt A. Madhavi**	GC for (M)(A),Ananthapur Ph:9949672448	7 Years	C/o college
6.	**Smt D Aruna Padma**	GDC(W), VISAKHAPATNAM 9030615618	7 Years	C/o college
7.	**Smt B. Durga Anuja**	GDC for Women, Srikalahasti Ph no:9908236775	7 Years	C/o college
8.	**Mr T. Narendra Babu**	Dr YSR. GDC, Vedurukuppam, Ph: 7702917803	4 years	C/o college
9.	**Mr B.Ravi**	GDC Vijayanagaram Ph: 9494332331	4 years	C/o college

P.R.GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA – 533 001
DEPARTMENT OF COMPUTER APPLICATIONS
ALLOCATION OF CREDITS AT SUBJECT LEVEL
Under CBCS from 2025-2026(Admitted Batch) and Prior Batches
Course: B.Sc (Information Technology)

YEAR	SEM	COURSE CODE	MODULE NATURE	COURSE TITLE	Hrs. / Week	Max. Marks			Credits
						Int.	Ext	Tot	
I	I	IT1	Course-1	Computer Fundamentals and Office Automation	3	50	50	100	3
			Course-1 Practical	Computer Fundamentals and Office Automation-Practical	2	-	-	50	1
		IT2	Course-2	Problem Solving Using C	3	50	50	100	3
			Course-2 Practical	Problem Solving Using C - Practical	2	-	-	50	1
	II	IT3	Course-3	Data Structures using C	3	50	50	100	3
			Course-3 Practical	Data Structures using C - Practical	2	-	-	50	1
		IT4	Course-4	Digital Logic Design	3	50	50	100	3
			Course-4 Practical	Digital Logic Design-Practical	2	-	-	50	1
				Community Service Project	-	-	-	100	4
II	III	IT5	Course-5	Database Management Systems- (T)	3	50	50	100	3
			Course-5 Practical	Database Management Systems- (P)	2	-	-	50	1
		IT6	Course-6	Python Programming- (T)	3	50	50	100	3
			Course-6 Practical	Python Programming- (P)	2	-	-	50	1
		IT7	Course-7	Operating Systems- (T)	3	50	50	100	3
			Course-7 Practical	Operating Systems- (P)	2	-	-	50	1
		IT8	Course-8	Computer Architecture - (T)	3	50	50	100	3
			Course-8 Practical	Computer Architecture - (P)	2	-	-	50	1

	IV	IT9	Course-9	Web Technologies- (T)	3	50	50	100	3
			Course-9 Practical	Web Technologies- (P)	2	-	-	50	1
		IT10	Course-10	Object Oriented Programming using Java- (T)	3	50	50	100	3
			Course-10 Practical	Object Oriented Programming using Java- (P)	2	-	-	50	1
		IT11	Course-11	Data Structures Using Python- (T)	3	50	50	100	3
			Course-11 Practical	Data Structures Using Python- (P)	2	-	-	50	1
				Internship	-	-	-	100	4
III	V	IT12	Course-12	R Programming - (T)	3	50	50	100	3
			Course-12 Practical	R Programming - (P)	2	-	-	50	1
		IT13	Course-13	Software Engineering- (T)	3	50	50	100	3
			Course-13 Practical	Software Engineering - (P)	2	-	-	50	1
		IT14	Course-14	Computer Networks- (T)	3	50	50	100	3
			Course-14 Practical	Computer Networks - (P)	2	-	-	50	1
		IT15	Course-15	Mobile Application Development –(T)	3	50	50	100	3
			Course-15 Practical	Mobile Application Development –(P)	2	-	-	50	1
	VI			Semester Apprenticeship	-	-	-	200	4

SEMESTER-1

P.R.GOVERNMENT COLLEGE(AUTONOMOUS), KAKINADA					
Course Code :	**COMPUTER FUNDAMENTALS & OFFICE AUTOMATION**	**I B.Sc (IT) SEM-I Major 1 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites		3	-	1	4

Course Objectives	
CO1	1. Understand foundational computing concepts including number systems, evolution of computers, and architectural components.
CO2	2. Explore basic computer organization and network fundamentals, recognizing device functions, system types, and internet components.
CO3	3. Demonstrate proficiency in word processing and presentation tools, applying formatting techniques and design elements for professional outputs.
CO4	4. Develop competency in spreadsheet operations, employing formulas, charts, and data-handling techniques.
CO5	5. Apply advanced data modeling and productivity features to analyze and visualize data efficiently using modern tools.

Course Outcomes

On completion of the course, the students will be able to		
Outcome	**Description**	**Cognitive Level**
CO1	Convert between binary, decimal, octal, and hexadecimal systems	Knowledge
CO2	Learners will demonstrate basic blocks of a computer and fundamental networking knowledge.	Knowledge
CO3	Create professional-level documents and design visually appealing presentations	Analysis and Evaluation
CO4	Manipulate data within spreadsheets, apply formulas	Application
CO5	Apply data modeling techniques to analyze, organize, and represent	Creativity

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

COMPUTER FUNDAMENTALS & OFFICE AUTOMATION

Unit 1. Number Systems, Evolution, Block Diagram and Generations:
Number Systems: Binary, Decimal, Octal, Hexadecimal; conversions between number systems.
Evolution of Computers: History from early mechanical devices to modern-day systems.
Block Diagram of a Computer: Components like Input Unit, Output Unit, Memory, CPU (ALU + CU).
Generations of Computers: First to Fifth Generation – technologies, characteristics, examples.

Unit 2. Basic organization and N/W fundamentals:
Computer Organization: Functional components – Input/ Output devices, Storage types, Memory hierarchy.
Types of Computers: Micro, Mini, Mainframe, and Supercomputers.
Networking Fundamentals: Definition, need for networks, types (LAN, WAN, MAN), topology (Star, Ring, Bus).
Internet Basics: IP Address, Domain Name, Web Browser, Email, WWW.

Unit 3. Word Processing and presentations:
Word Processing Basics: Using MS Word/Google Docs – formatting, styles, tables, mail merge.
Presentation Tools: Using PowerPoint/Google Slides – slide design, animations, transitions.
Applications: Creating resumes, reports, brochures, and presentations. Keyboard Shortcuts

Unit 4. Spreadsheet Basics:
Spreadsheet Concepts: Understanding rows, columns, cells in tools like MS Excel/Google Sheets, cell referencing.
Functions and Formulae: SUM, AVERAGE, IF, COUNT.
Charts and Graphs: Creating visual representations
Data Handling: Sorting, filtering, conditional formatting.
Text Functions: LEFT, RIGHT, MID, LEN, TRIM, CONCAT, TEXTJOIN
Advanced Functions: Logical: IF, AND, OR, IFERROR, Lookup: VLOOKUP, HLOOKUP, XLOOKUP, INDEX, MATCH

Unit 5. Data Analysis and Visualization:
Conditional Formatting: Custom rules, Color scales, Icon sets, Data bars
Data Analysis Tools: Pivot Tables and Pivot Charts, Data Validation (Drop-downs, Input Messages, Error Alerts), What-If Analysis: Goal Seek, Scenario Manager, Data Tables
Charts and Dashboards: Creating Interactive Dashboards, Using slicers with Pivot Tables, Combo Charts and Sparklines
Productivity Tips: Using Named Ranges, Freeze Panes, Split View

Textbooks:

1. Fundamentals of Computers, Reema Thareja, Oxford University Press, Second Edition
2. Fundamentals of Computers, V. Rajaraman – PHI Learning
3. Introduction to Computers by Peter Norton – McGraw Hill
4. Microsoft Office 365 In Practice by Randy Nordell – McGraw Hill Education

References:

1. Excel 2021 Bible by Michael Alexander, Richard Kusleika – Wiley
2. Networking All-in-One For Dummies by Doug Lowe – Wiley
3. Microsoft Official Docs and Training: https://learn.microsoft.com
4. Google Workspace Learning Center: https://support.google.com/a/users/

Activities:

Outcome: At the End of the Course, The Students will be able to explain different number systems, the historical evolution of computers, and identify key components in a block diagram.

Activity: Create a digital poster or infographic comparing number systems (binary, decimal, octal, hexadecimal) and illustrating the timeline of computer generations with key innovations.
Evaluation Method: Rubric-based assessment of the poster presentation on a 10-point scale focusing on:
- Accuracy of number system conversions
- Correct identification of block diagram components
- Visual organization and creativity

Outcome: Learners will demonstrate basic blocks of a computer and fundamental networking knowledge.

Activity: Design a concept map showing the internal architecture of a computer and types of networks (LAN, WAN, MAN), including devices and topologies.
Evaluation Method: Checklist-based peer review and instructor validation:
- Completeness of the map
- Correctness of networking concepts
- Use of appropriate terminology
- Logical flow and structure of the map

Outcome: Learners will create professional-level documents and design visually appealing presentations using word processing software and presentation software.
Activity: Prepare a formal report (e.g., project proposal) in a word processor and present it using a slide deck with transitions, embedded media, and design elements.
Evaluation Method: Performance-based evaluation using a 10-point scoring scale:
- Formatting and structure of the document
- Presentation aesthetics and clarity
- Communication skills during presentation

Outcome: Learners will manipulate data within spreadsheets, apply formulas, and generate accurate summaries and visualizations.
Activity: Analyze a dataset (e.g., student scores or sales data) using spreadsheet software. Apply formulas (SUM, AVERAGE, IF, VLOOKUP) and create relevant charts.
Evaluation Method: Practical test with a rubric:
- Correct use of formulas
- Accuracy of data summaries

Outcome: Learners will apply data modelling techniques to analyze, organize, and represent data effectively in various scenarios.
Activity: Prepare an interactive dashboard for a given data set using EXCEL.
Evaluation Method: Evaluation of the dashboard on a 10-point scoring scale:
- Presentation aesthetics and clarity
- Interactiveness
- Communication skills during presentation

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

COMPUTER FUNDAMENTALS & OFFICE AUTOMATION

Practical **Credits: 1** **2 hrs/week**

List of Experiments:

1. Demonstration of Assembling and Dessembling of Computer Systems.
2. Identify and prepare notes on the type of Network topology of your institution.
3. Prepare your resume in Word.
4. Using Word, write a letter to your higher official seeking 10-days leave.
5. Prepare a presentation that contains text, audio and video.
6. Using a spreadsheet, prepare your class Time Table.
7. Using a Spreadsheet, calculate the Gross and Net salary of employees(Min 5) considering all the allowances.
8. Generate the class-wise and subject-wise results for a class of 20 students. Also generate the highest and lowest marks in each subject.
9. Using IF, AND, OR, and IFERROR to Automate Grade Evaluation.
    a. Create a table of student scores in different subjects.
    b. Use IF to assign grades (A/B/C/Fail).
    c. Use IFERROR to handle missing scores or invalid data.
10. Employee Database Search Using VLOOKUP, HLOOKUP, XLOOKUP, INDEX, and MATCH
    a. Create a database of employees (Name, ID, Department, Salary).
    b. Implement VLOOKUP to search by employee ID.
    c. Use HLOOKUP to extract department heads by role.
    d. Apply XLOOKUP for more flexible searches.
    e. Use INDEX + MATCH as an alternative to VLOOKUP.
11. Sales Report Analysis Using Pivot Tables and Charts
    a. Use a dataset of product sales (Product, Region, Date, Quantity, Revenue).
    b. Create Pivot Tables to summarize data by region/product.
    c. Insert Pivot Charts for visual analysis (e.g., bar, line).
    d. Add slicers to make the dashboard interactive.
12. Designing a Data Entry Form with Drop-downs and Input Rules
    a. Create a student registration form.
    b. Add drop-down lists for course selection using Data Validation.
    c. Add input messages to guide users.

d. Add error alerts for wrong entries.

13. Monthly Budget Planning using Goal Seek and Scenario Manager
    a. Create a simple personal budget (income, expenses, savings).
    b. Use Goal Seek to determine income needed to save a desired amount.
    c. Use Scenario Manager to compare different budgeting scenarios (best/ worst/ realistic case).
    d. Create a one-variable Data Table to analyze how different expenses affect savings.
14. Dashboard Creation Using Combo Charts, Sparklines & Slicers
    a. Use existing sales or attendance data.
    b. Insert combo charts (e.g., column + line).
    c. Add sparklines to show trends.
    d. Use slicers with Pivot Tables to control dashboard elements.
    e. Finalize and format for interactivity.

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

DEPARTMENT OF COMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

COMPUTER FUNDAMENTALS & OFFICE AUTOMATION

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-I Essay Questions	6	10	60	3	10	30
2	Section-II Short Questions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		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	1	2	20
UNIT-II	1	2	20
UNIT-III	2	1	25
UNIT-IV	1	1	15
UNIT-V	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

COMPUTER FUNDAMENTALS & OFFICE AUTOMATION

Time:2 Hrs **Max. Marks: 50**

SECTION –I

Answer any three of the following questions. Must attempt at l east one question from each part.

Each question carries 10 Marks. **3 X 10 = 30M**

Part-A

1. Explain the generations of Computers and their technology.
2. What are the different types of computers? Explain each type.
3. What is MS-Word? Explain features of MS –Word?.

Part-B

4. How to create presentation in MS-Power point?
5. What are the different types of charts that are available in MS-Excel? Explain.
6. Describe the purpose of data analysis tools.

SECTION - II

Answer any four of the following questions. Each question carries 5 marks.

4 X 5 = 20M

7. How to convert decimal number to binary number ? explain with example
8. Explain about Memory in Computer?
9. Explain about network Topologies?
10. Describe working of E-mail.
11. How to insert table in Microsoft word?
12. What are the types of Cell Referencing? Explain
13. Write about Pivot tables.

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

COMPUTER FUNDAMENTALS & OFFICE AUTOMATION

Question Bank

Unit-1

Essay Questions

1.	Draw the Block Diagram of Digital Computer? Explain the functions of each component?	BT2	CO1	PO1
2.	Discuss the Five generations of computer and specify the underlying technology?	BT1	CO2	PO2
3.	Explain the Four number systems with examples?	BT1	CO3	PO3

Unit-2

1.	Classify the types of computers based on their size and capability?	BT1	CO1	PO1
2.	Define the Network and Explain Network Topologies	T1	CO2	PO2
3.	Define the Memory hierarchy? Differentiate Primary and Secondary memory?	BT2	CO3	PO3

Unit-3

1.	What is MS-Word? Explain features of MS –Word?.	BT1	CO1	PO1
2.	What is Mail Merge? Explain the Process of Creating a mail merge	BT1	CO2	PO2
3.	What is PowerPoint? How to create presentation in MS-Power point?	BT1	CO2	PO2

Unit-4

1.	Discuss the importance of Charts and Graphs in Excel?	BT1	CO1	PO1
2.	Explain about Sorting and Filtering in Excel?	BT1	CO2	PO2
3.	Briefly Explain about SUM, AVERAGE, IF, MAX, MIN functions in Excel	BT2	CO3	PO3

Unit-5

1.	Explain What-IF-Analysis?	BT1	CO1	PO1
2.	Explain about Pivot Table in excel?	BT1	CO2	PO2

Short Answer Questions

Unit-1

1.	Briefly differentiate between roles of ALU and CU	BT2	CO1	PO1
2.	Define Hexadecimal number System and list out the digits / characters	BT1	CO2	PO2
3.	Explain about Memory in Computer?	BT1	CO3	PO3

Unit-2

1.	Differentiate LAN vs WAN	BT2	CO1	PO1
2.	What is Email? Write its advantages	BT2	CO2	PO2

3.	Define IP Address?	BT1	CO3	PO3

Unit-3

1.	What is Header and Footer?	BT1	CO1	PO1
2.	Differentiate Transition vs Animation?	BT2	CO2	PO2
3.	Briefly Explain about any Five Shortcut keys in MS-Word	BT2	CO2	PO2

Unit-4

1.	What is Cell referencing in excel?	BT2	CO1	PO1
2.	What is Conditional Formatting?	BT1	CO2	PO2

Unit-5

1.	Explain about Data Validation?	BT2	CO1	PO1
2.	Explain the purpose of Freeze pane and Split view?	BT1	CO2	PO2

Mapping of Cos with POs/PSOs

CO /PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

P.R.GOVERNMENT COLLEGE(AUTONOMOUS), KAKINADA					
Course Code :	**PROBLEM SOLVING USING C**	**I B.Sc (IT) SEM-I Major 2 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites		3	-	1	4

Course Objective
1. Understand the basics of C 2. Understand the syntax of C-programming language 3. Apply C-programming skill to solve problems

Course Outcomes	
Upon successful completion of the course, a student will be able to:	
CO1	1. Understand the functionality of a Digital Computer and fundamental constructs of programming.
CO2	2. Analyze and develop solutions to a given problem using control statements.
CO3	3. Work with arrays and textual information
CO4	4. Understand the concept of functional hierarchical code organization.
CO5	5. Gain knowledge on derived data types and file handling.

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

PROBLEM SOLVING USING C

Unit 1. Introduction to computer programming:

Introduction, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming, Flowcharts and Algorithms, Fundamentals of C: History of C, Features of C, C Tokens-variables and keywords and identifiers, constants and Data types, Rules for constructing variable names, Operators, Structure of C program, Input /output statements in C-Formatted and Unformatted I/O

Unit 2. Control statements:

Decision making statements: if, if else, else if ladder, switch statements. Loop control statements: while loop, for loop and do-while loop. Jump Control statements: break, continue and goto.

Unit 3. Derived data types in C:

Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation. Strings: Declaring & Initializing string variables; String handling functions, Character handling functions

Unit 4. Functions:

Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic, Pointers and arrays.

Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion (Basic Concept only). Parameter Passing by address & by value. Local and Global variables. Storage classes: automatic, external, static and register.

Unit 5. Dynamic Memory Management:

Introduction, Functions-malloc, calloc, realloc, free Structures: Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers. Unions - Union definition; difference between Structures and Unions. Working with text files - modes: opening, reading, writing and closing text files.

Text Books:

1. Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill, 6 th Edn,

2. Computer fundamentals and programming in C, Reema Theraja, Oxford University Press

Reference Books:

1. Let us C, Y Kanetkar, BPB publications
2. Head First C: A Brain-Friendly Guide, David Griffiths, Dawn Griffiths

Activities:

Outcome: Understand basic computing concepts, programming paradigms and write structured C programs.

Activity: Create a concept map of computing fundamentals and programming paradigms (procedural, structured, object-oriented). Then, they write a structured C program (e.g., a calculator or student grade system) using proper syntax, indentation, and modular design.

Evaluation Method: Rubric-based Code Review & Viva to check the

- The correctness of the concept map
- Correct use of structure (main + functions)
- Identification of paradigm used
- Code readability and documentation

Outcome: Apply control flow statements to solve logical and repetitive tasks in C.

Activity: Implement a program that solves a logic puzzle (e.g., number guessing game, pattern generation, or prime number finder) using if, switch, for, while, and do-while.

Evaluation Method: Automated Test Cases + Peer Review to check the

- Correct use of control statements
- Logical correctness of output
- Efficiency and edge case handling
- Peer feedback on clarity and logic

Outcome: Implement arrays and string operations to manage and manipulate data efficiently.

Activity: Build a program that stores and arranges student marks in ascending and descending order using arrays and performs string operations like concatenation, comparing, and formatting names.

Evaluation Method: Functional Demonstration + Code Walkthrough to check the

- Correct array and string usage
- Memory efficiency
- Handling of invalid inputs

○ Explanation of sorting/searching logic

Activity:

- Recursive Problem Solver Students write a modular program to solve a recursive problem (e.g., factorial, Fibonacci, or Tower of Hanoi) using functions with parameters and return values.

Evaluation Method:

- Code Trace + Written Quiz

○ Correct function decomposition

○ Proper parameter passing (by value/reference)

○ Recursion depth and base case handling

○ Quiz on tracing recursive calls

Outcome: Utilize pointers and memory operations for effective data handling. Demonstrate competence in dynamic memory allocation and text file processing.

Activity: Create a program that dynamically stores user input (e.g., survey responses) using pointers and writes/reads the data to/from a text file.

Evaluation Method: Memory Debugging + File I/O Assessment to check the

○ Proper use of malloc, calloc, realloc, and free

○ Pointer arithmetic and dereferencing

○ File creation, reading, writing, and error handling

○ Use of tools like Valgrind or manual memory trace (Optional for Unix flavours)

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

PROBLEM SOLVING USING C

Practical **Credits: 1 2 hrs/week**

List of Experiments:

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 terms of the Fibonacci sequence.
4. Write a program to find both the largest and smallest number in a list of integer values
5. Write a program to demonstrate change in parameter values while swapping two integer variables using Call by Value & Call by Address
6. Write a program to perform various string operations.
7. Write a program to search an element in a given list of values.
8. Write a program that uses functions to add two matrices.
9. Write a program to calculate factorial of given integer value using recursive functions
10. Write a program for multiplication of two N X N matrices.
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 read / write the data from / to a file.
14. Write a program to reverse the contents of a file and store in another 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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

PROBLEM SOLVING USING C

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-I Essay Questions	6	10	60	3	10	30
2	Section-II Short Questions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		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	1	2	20
UNIT-II	1	2	20
UNIT-III	2	1	25
UNIT-IV	1	1	15
UNIT-V	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–I (W.E.F.2025-26)

PROBLEM SOLVING USING C

Time:2 Hrs **Max. Marks: 50**

SECTION –I

Answer any three of the following questions. Must attempt at l east one question from each part.

Each question carries 10 Marks. **3 X 10 = 30M**

Part-A

1. Explain the generations of Computers and their technology.
2. What are the different types of computers? Explain each type.
3. What is MS-Word? Explain features of MS –Word?.

Part-B

4. How to create presentation in MS-Power point?
5. What are the different types of charts that are available in MS-Excel? Explain.
6. Describe the purpose of data analysis tools.

SECTION - II

Answer any four of the following questions. Each question carries 5 marks. 4 X 5 = 20M

7. How to convert decimal number to binary number ? explain with example
8. Explain about Memory in Computer?
9. Explain about network Topologies?
10. Describe working of E-mail.
11. How to insert table in Microsoft word?
12. What are the types of Cell Referencing? Explain
13. Write about Pivot tables.

Mapping of Cos with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P O 1 0	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

SEMESTER-2

P.R.GOVERNMENT COLLEGE(AUTONOMOUS), KAKINADA					
Course Code :	**DATA STRUCTURES USING C**	**I B.Sc (IT) SEM-II Major 3 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites		3	-	1	4

Course Objective
1. Understand fundamental concepts of algorithms and data structures with focus on complexity analysis and abstract data types.
2. Explore various types of linked lists and their dynamic memory representations and operations.
3. Analyze and implement linear data structures, such as stacks and queues, and examine their real-world applications.
4. Apply sorting and searching algorithms, understanding their performance implications and optimization strategies.
5. Design and manipulate hierarchical and graph-based structures, applying traversal algorithms and understanding their practical uses in computing.

Course Outcomes	
Upon successful completion of the course, a student will be able to:	
CO1	1. Explain algorithm characteristics, time and space complexity, and asymptotic notations with clarity.
CO2	2. Implement and analyze different types of linked lists, including insertion, deletion, and traversal operations.
CO3	3. Develop stack and queue data structures using arrays and linked lists, and apply them in expression evaluation.
CO4	4. Apply efficient searching and sorting algorithms to solve computational problems and evaluate performance trade-offs.
CO5	5. Construct and traverse tree and graph structures, using them to solve problems like shortest path and spanning trees.

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–II (W.E.F.2025-26)

DATA STRUCTURES USING C

Unit 1. Basic Concepts: Algorithm: Definition and characteristics, Complexity analysis: Space Complexity, Time Complexity, Asymptotic Notations. Introduction to Data structures: Definition, Types of Data structures, Abstract Data Types (ADT), Introduction to Linked Lists, Representation of linked lists in Memory, Comparison between Linked List and Array.

Unit 2. Linked Lists: Types of Linked Lists - Singly Linked list, Doubly Linked list, Circularly Singly Linked list, Circularly Doubly Linked list; Implementation of Single Linked List ADT: Creating a List, Traversing a linked list, Searching in linked list, Insertion and deletion into linked list (At first Node, Specified Position, Last node).

Unit 3. Stacks and Queues: Introduction to stack ADT, Implementation of stacks using array and Linked List, Application of stacks - Polish Notations - Converting Infix to Post Fix Notation - Evaluation of Post Fix Notation. Queues: Introduction to Queue ADT, Implementation of Queues using array and Linked List, Application of Queues Types of Queues- Circular Queues, De-queues, Priority Queue, Heaps.

Unit 4. Searching and Sorting: Linear or Sequential Search, Binary Search, Hashing and collision resolution. Sorting: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort and Merge Sort

Unit 5. Trees and Graphs: Tree Terminology, Binary Tree Representation, Traversal techniques, Expression Tree, Binary Search Tree- Definition, Operations on a Binary Search Tree: Creation, Search, Insertion & deletion. Graphs: Introduction to Graphs, Terminology, Representation (Adjacency Matrix, Adjacency List), Traversal of Graphs (DFS, BFS), Applications of Graphs, Concept of Shortest Path Problems, Concept of Minimum Cost Spanning Tree

Textbooks:1. Data Structures Using C, Balagurusamy E. Tata MCGraw Hill
2. Data Structures using C, Reema Thareja, Third Edition, Oxford University Press

Reference Books:1. Data Structures, Lipschutz, Schaum's Outline Series, Tata Mcgraw-hill
2. Data Structures Using C, Ch. Vijay Kumar, Pen Press International

Activities: Outcome: Explain algorithm characteristics, time and space complexity, and asymptotic notations with clarity

Activity: Create a comparative chart of algorithms with different notations related to time and space complexities.Evaluation Method: Rubric-based assessment of the chart for correctness, clarity, and depth of explanation on a 10-point scale.Outcome: Implement and analyze different types of linked lists, including insertion, deletion, and traversal operations

Activity: Code a menu-driven program in C to implement single linked lists with all basic operations.Evaluation Method: Practical lab assessment with test cases and Viva-style

questioning to explain pointer manipulation.Outcome: Develop stack and queue data structures using arrays and linked lists, and apply them in expression evaluation

Activity: Build a program to convert infix expressions to postfix and evaluate them using stacks; Implement queues using both arrays and linked lists with enqueue/dequeue operations.Evaluation Method: Code review and execution of programs for sample cases and evaluation based on correctness and efficiency.Outcome: Apply efficient searching and sorting algorithms to solve computational problems and evaluate performance trade-offs

Activity: Implement and compare sorting algorithms (e.g., selection sort and bubble sort) and searching algorithms (e.g., Linear vs. Binary Search) on datasets of varying sizes. Record number of swaps and iterations for preparing a chart to assimilate the results.Evaluation Method: Performance report with graphs and analysis. Oral presentation or peer review discussing trade-offs and algorithm selection rationale.

Outcome: Construct and traverse tree and graph structures, using them to solve problems like shortest path and spanning trees

Activity: Implement binary trees and graphs using adjacency lists/matrices. Evaluation Method: Lab demo with sample inputs and visual output (e.g., tree traversal order, graph paths).

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–II (W.E.F.2025-26)

DATA STRUCTURES USING C

Practical **Credits: 1 2 hrs/week**

List of Experiments

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 an element using a values and index
d. Delete an existing element

2. Write a program to implement Single Linked List with insertion, deletion and traversal operations3. Write a program to implement Doubly Linked List with insertion, deletion and traversal operations
4. Write a program to implement the Stack operations using Arrays and Linked Lists.
5. Write a program to convert a given infix expression to a postfix expression using stacks.
6. Write a program to implement the Queue operations using Arrays and Linked Lists.
7. Write a program to implement the Circular Queue operations using Arrays.
8. Write a program for Binary Search Tree Traversals
9. Write a program to search an item in a given list using the following Searching Algorithms

a. Linear Search
b. Binary Search.

10. Write a program for implementation of the following Sorting Algorithms

a. Bubble Sort
b. Insertion Sort
c. Quick Sort
d. Merge Sort

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–II (W.E.F.2025-26)

DATA STRUCTURES USING C

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-I Essay Questions	6	10	60	3	10	30
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TOTAL		13		95	TOTALMARKS		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	1	2	20
UNIT-II	1	2	20
UNIT-III	2	1	25
UNIT-IV	1	1	15
UNIT-V	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

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

DEPARTMENTOFCOMPUTER APPLICATIONS

I B.Sc (IT) Semester–II (W.E.F.2025-26)

DATA STRUCTURES USING C

Time:2 Hrs **Max. Marks: 50**

SECTION –I

Answer any three of the following questions. Must attempt at l east one question from each part.

Each question carries 10 Marks. **3 X 10 = 30M**

Part-A

1. Define Data Structures. Describe different types of data structures?
2. What is an Abstract Data type (ADT)? Explain its importance with examples
3. What is Linked list? Explain different types of linked list?

Part-B

4. What is Stack ? Explain implementation stack using array?
5. Explain working of binary search algorithm with an example
6. Describe the Operations on a binary search tree (creation, insertion, search)

SECTION - II

Answer any four of the following questions. Each question carries 5 marks. 4 X 5 = 20M

7. Differentiate between time complexity and space complexity
8. Compare linked list and array
9. What is single linked list
10. What is Queue? Give an example?
11. Differentiate between linear and binary search?
12. What is hashing?
13. Define tree terminology.

Mapping of Cos with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P O 1 0	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

PRGOVERNMENTCOLLEGE(AUTONOMOUS),KAKINADA					
Course Code	**DIGITAL LOGIC DESIGN**	**I B.Sc (IT) SEM-II 2025-26**			
Hours	90 (60Theory+ 30Practical)	L	T	P	C
Pre requisites	BASIC COMPUTER KNOWLEDGE	3	-	1	4

CourseObjective
1. Introduce the fundamentals of number systems, their conversions, and binary arithmetic operations. .
2. Simplify logic functions using Boolean algebra, Karnaugh maps, and universal gates.
3. Develop proficiency in designing basic combinational circuits like adders and subtractors.
4. Equip students with the skills to implement advanced combinational components such as multiplexers, encoders, and decoders.
5. Foster understanding of sequential circuits, flip-flops, counters, and shift registers forsystem-level design.

On Completion of the course, the students will be able to-		CognitiveDomain
CO1	Apply concepts of number systems to perform radix conversions and binary arithmetic using signed and unsigned formats.	Understanding
CO2	Simplify logic functions using Boolean algebra, Karnaugh maps, and universal gates.	Application
CO3	Design and analyze combinational circuits such as half adders, full adders, and subtractors.	Application
CO4	Construct advanced combinational logic modules, including multiplexers, demultiplexers, encoders, decoders, and their hierarchical versions. Realize complex Boolean functions using combinations of logic modules.	Application
CO5	Develop and evaluate sequential circuits such as flip-flops, latches, counters, and shift registers.	Application

P R GOVT COLLEGE (AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

I BSC (IT) SEMESTER - II (W.E.F. 2025-26)

SEMESTER-II

COURSE 4: DIGITAL LOGIC DESIGN

Theory Credits: 3 3 hrs/week

Unit 1: Number Systems:
Conversion of numbers from one radix to another radix, r's, (r-1)'s complements, signed binary numbers, addition and subtraction of unsigned and signed numbers, weighted and unweighted codes.

Unit 2. Logic Gates and Boolean Algebra:
NOT, AND, OR, universal gates, X-OR and X-NOR gates, Boolean laws and theorems, complement and dual of a logic function, canonical and standard forms, two level realization oflogic functions using universal gates, minimizations of logic functions (POS and SOP) usingBoolean theorems, K-map (up to four variables), don't care conditions.

Unit 3. Combinational Logic Circuits – 1:
Design of half adder, full adder, half subtractor, full subtractor, ripple adders and subtractors, ripple adder / subtractor.

Unit 4. Combinational Logic Circuits – 2:
Design of decoders, encoders, priority encoder, multiplexers, demultiplexers, higher order decoders, demultiplexers and multiplexers, realization of Boolean functions using decoders, multiplexers.

Unit 5. Sequential Logic Circuits:
Classification of sequential circuits, latch and flip-flop, RS- latch using NAND and NOR Gates RS, JK, T and D flip-flops, truth tables and excitation tables, conversion of flip- flops, flip-flopswith asynchronous inputs (preset and clear). Registers- shift registers, bidirectional shift registers,universal shift register, design of ripple counters, modulus counters.

Text Books:

1. Digital Design, M. Morris Mano, Michael D Ciletti,5th edition, Pearson.
2. Digital Logic Design, K.C. Rao, Ramana, Pen International Press

Reference Books:

1. Digital Electronics and Logic Design, Jaydeep Chakravorty, Universities Press
2. Digital Logic Design, Sonali Singh, BPB Publications

Activities:

Outcome: Apply concepts of number systems to perform radix conversions and binary arithmeticusing signed and unsigned formats

Activity: Design a calculator in a spreadsheet or simulation tool (e.g., Logisim) that performs: Decimal ↔ Binary ↔ Hexadecimal conversions and binary arithmetic (addition, subtraction).

Evaluation Method: Rubric-based evaluation on a 10point scale (conversion accuracy, arithmeticcorrectness)

Outcome: Simplify logic functions using Boolean algebra, Karnaugh maps, and universal gates

Activity: Provide students with complex Boolean expressions and truth tables. Ask them to: Simplify using Boolean laws, Minimize using Karnaugh maps and Implement using only NANDor NOR gates

Evaluation Method: Worksheet submission with step-by-step simplification and evaluation ofgate-level implementation using a 10-point scale.

Outcome: Design and analyze combinational circuits such as half adders, full adders, and Subtractors

Activity: Build and simulate: Half adder and full adder using logic gates, and half and full subtractor circuits

Evaluation Method: Evaluate the correctness of the circuits for different inputs on a 10-pointscale.

Outcome: Construct advanced combinational circuits, including multiplexers,demultiplexers,encoders and decoders.

Activity: Design Multiplexers for function selection, Decoders for control signal generation andEncoders for input compression
Evaluation Method: Project-based evaluation with functional demo and assessments based on a10-point scale.

Outcome: Develop and evaluate sequential circuits such as flip-flops, latches, counters, and shiftregisters

Activity: Implement and test SR, JK, D, T flip-flops, asynchronous and synchronous countersusing a simulator (E.g. Logisim, Multisim)

Evaluation Method: Lab assessment on a 10-point scale to understand the correctness of the circuit and presentation of the design.

P R GOVT COLLEGE (AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

I BSC (IT) SEMESTER - II (W.E.F. 2025-26)

SEMESTER-II

COURSE 4: DIGITAL LOGIC DESIGN

Practical Credits: 1 2 hrs/week

List of Experiments

The laboratory work can be done by using physical gates and necessary equipment or simulators. Simulators: https://sourceforge.net/projects/gatesim/ or https://circuitverse.org/ or any free opensource simulator

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean functions using logic gates in both SOP and POS forms
3. Realization of basic gates using universal gates.
4. Design and implementation of half and full adder circuits using logic gates.
5. Design and implementation of half and full subtractor circuits using logic gates.
6. Verification of stable tables of RS, JK, T and D flip-flops using NAND gates.
7. Implementation and verification of Decoder and encoder using logic gates.
8. Implementation of 4X1 MUX and DeMUX using logic gates.
9. Implementation of 8X1 MUX using suitable lower order MUX.
10. Implementation of 7-segment decoder circuit.
11. Implementation of 4-bit parallel adder.
12. Design and verification of 4-bit modulus counter

P R GOVT COLLEGE (AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

I BSC (IT) SEMESTER - II (W.E.F. 2025-26)

DIGITAL LOGIC DESIGN

PAPER- **Marks 50M**

Model blue print for the model paper and choice

S.NO	Type of Question	TobegiveninttheQuestion Paper			Tobeanswered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Essay Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-B Short Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTALMARKS**		**50**

$$\text{Percentageofchoicegiven} = \frac{95-50}{95} \times 100 = \frac{45}{95} \times 100 = 47.36\%$$

Model Blue print for the question paper setter

ChapterName	Essay Questions 10 Marks	Short Questions 5 Marks	Marksallotted tothechapter
UNIT-I	**2**	**2**	**30**
UNIT-II	**1**	**1**	**15**
UNIT-III	**1**	**1**	**15**
UNIT-IV	**1**	**2**	**20**
UNIT-V	**1**	**1**	**15**
TotalNo.of questions	**6**	**7**	
Total Marks Including choice			**95**

P R GOVT COLLEGE (AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

I BSC (IT) SEMESTER - II (W.E.F. 2025-26)

DIGITAL LOGIC DESIGN

PAPER- **Marks 50M**

Time:2 Hrs **SEMESTER-II** **Max.Marks:50**

SECTION-I

Answer Any Three Questions. At least One question from each part (3x10=30M)

Part-A

1. Explain the various types of number systems with examples.
2. Discuss signed binary number representation and the methods of addition and subtraction for signed numbers.
3. Explain the basic logic gates with their truth tables and symbols.

Part-B

4. Explain the working of a half subtractor and full subtractor with truth tables and logic diagrams
5. Explain the working of a multiplexer and demultiplexer with truth tables and diagrams.
6. Explaintheclassification of sequential circuits with examples.

SECTION-II

Answer any FOUR Questions. Each question carries 5 marks (4x5=20M)

7. Convert $(101101)_2$ to decimal, octal, and hexadecimal.?
8. Convert $(256)_{10}$ into binary and hexadecimal?
9. What are universal gates? Why are they called universal?
10. What is the function of a half adder?
11. Define encoder and decoder.
12. What is the difference between multiplexer and demultiplexer?
13. What is the difference between combinational and sequential circuits?

Mapping of Cos with POs/PSOs

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

SEMESTER-3

PRGOVERNMENTCOLLEGE(AUTONOMOUS),KAKINADA					
Course Code	**DATABASE MANAGEMENTSYSTEM**	**II B.Sc.- (IT) Major-5 Sem-III 2025-26**			
Hours	90(60Theory+30 Practical)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

CourseObjective
1. Understand the role of a database management system in an organization. 2. Understand basic data base concepts,including the structure and operation of the relational data model. 3. Understand and successfully apply logical database design principles, including E-R diagrams and database normalization 4. Understand Functional Dependency and Functional Decomposition. 5. Gets the information about creating tables, modifications of tables etc. 6. Gets knowledge about writing of PL/SQL program with many options like Triggers, functions, procedures etc.

CourseOutcomes	
OnCompletionofthecourse,thestudentswillbeableto–	
CO1	Students would learn about Understand the role of a database management system in an organization. Understand basic database concepts,Including the structure and operation of the relational data model. Understand and successfully apply logical database design principles, including E-R diagrams and database normalization Understand Functional Dependency and Functional Decomposition.
CO2	Students would learn about To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS. PerformPL/SQL programming using concept of Cursor Management ,ErrorHandling,Packages.
CO3	StudentswouldlearnaboutApplyvariousNormalizationtechniques Modelanapplication'sdatarequirementsusingconceptualmodelingtoolslikeERdiagramsand design database schemas based on the conceptual model .
CO4	Students would learn about Design and implement a small data base project.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

II BSC– IT Semester-III (W.E.F. 2025-26)

Data Base Management System

SYLLABUS

UNIT I

Overview of Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base.

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, 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, Functional dependencies and normal forms upto 3rd normal form and BCNF

Unit IV

Structured Query Language: Introduction, Commands in SQL, Data Types in SQL, SQL operators, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set perations, View, Sub Query.

UNIT V

PL/SQL: Introduction, Structure of PL/SQL program, PL/SQL Data Types, operators used in PL/SQL, variables, declaring variables in PL/SQL, Creating and running a PL/SQL Program, Control Structures: Conditional control statements, Iterative Control statements, Cursors: Types of cursors, Steps to create a Cursor, using cursors in PL/SQL program

Additional Inputs:

Transaction processing Concepts: Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

III.REFERENCES:

TEXT BOOKS:

1. DatabasemanagementSystems,AlexisLeonandMathewsLeon,VikasPublications2002
2. PeterRob,CarlosCoronel,DatabaseSystemsDesign,ImplementationandM anagement, Seventh Edition, Thomson (2007)
3. SQL,PL/SQLtheProgrammingLanguageofOracle,IvanBayross,BPBpublications

REFERENCEBOOKS:

1. Elimasri/Navathe,FundamentalsofDatabaseSystems,FifthEdition,Pear sonAddison Wesley (2007).
2. DatabasePrinciples,Programming,andPerformance,P.O'Neil,E.O'Neil,2nded.,ELSEVIER.

3. SQL:TheUltimateBeginnersGuidebySteveTale.
4. DatabaseSystemConceptsbyAbrahamSilberschatz,HenryKorth,andS.Sudars
han, McGrawhill
5. DatabaseManagementSystemsbyRaghuRamakrishnan,McGrawhill

Practical Component: @ 2 hours/week/batch

1. Create Table using create command and inserting data into create table with insert command
2. Write a sql commands to the given statements and to excuse the commands and display the outputs.

   Query-1: statements display unique jobs from table

   Query-2: statements list the detail of the employees who are working as clerk.

   Query-3: list all the clerk of department 20.

   Query-4: display the details of smith.

   Query-5: statement list the details of the employees who are either clerk or analyst.
3. Write a sql commands to the given statements and to excuse the commands and display the outputs.

   Query-1: list the details of employee in the ascending order of their salaries.

   Query-2: list the details of departments in descending order of their department number.

   Query-3: list the employee names starting with " s".

   Query-4: Find the name and salary of employees form table where salary is between 1000 and 2000.

   Query-5: Find the names from table when job in ('Analyst' , 'salesman').
4. Write a sql commands to the given statements and to excuse the commands and display the output using Aggregate functions.

   Query-1: find the maximum salary of table

   Query-2: find the minimum salary of table

   Query-3: find the no of employee working in department no 20.

   Query-4: find the total salary given out of all employees.

   Query-5: find the average salary of the employee.
5. Write a sql commands to the given statements and to excuse the commands and display the outputs.

   Query-1: list the employe numbers and names belonging to department 10 and 30 of table.

   Query-2: display the different designations (jobs) in dept 20 and 30 of table.

   Query-3: display all the jobs in the dept 20 and 30 of table

   Query-4: list the jobs common to dept 20 and 30.

   Query-5: list the jobs that are in dept no 20 but not in dept 30.

6. Write a sql commands to the given statements and to excuse the commands and display the outputs.

   Query-1: list the department details is where at least 2 employees are working.

   Query-2: delete the records of clerk from table'

   Query-3: delete the table structure and the data in the table.

   Query-4: delete the total records in a table not the structure.

   Query-5: truncate table.

PL/SQL PROGRAMS

1. Write a pl/sql program to swap 2 numbers.
2. Write a program to print the given number from 1 to 10.
3. Write a program to accept the values of a,b and c display which is greatest.
4. Write a program to check the number is prime or not.
5. Write a program to calculation of the factorial of a given no.
6. Write a program to display names and salary of highest 5 salary paid employees through cursor.

PRGOVTCOLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENTOFCOMPUTERAPPLICATIONS II
B.Sc (IT)Semester- III (2025-26)
DATABASEMANAGEMENTSYSTEM

Marks:50M

Modelblueprintforthemodel paperand choice

S.NO	TypeofQuestion	TobegivenintheQuestion Paper			Tobe answered		
		No. of Questions	Marks allotted toeach question	Total Marks	No. of Questions	Marks allotted toeach question	Total Marks
1	Section-I Essay Questions	6	10	60	3	10	30
2	Section-II ShortQuestions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		50

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

Model Blue print for the question paper Setter

ChapterName	EssayQuestions 10 Marks	ShortQuestions 5 Marks	Marksallotted tothe chapter
UNIT-I	2	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
TotalNo.of questions	6	7	
TotalMarksIncludingchoice			95

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

DEPARTMENT OF COMPUTER APPLICATIONS

II B.Sc (IT) Semester- III (2025-26)

DATA BASE MANAGEMENT SYSTEM

MODELPAPER

Time:2Hrs **SEMESTER-III** **Max.Marks: 50**

SECTION-I

Answer Any Three Questions. At least One question from each part (3x10=30M)

Part-A

1. What is meant by DBMS? Explain advantages of DBMS (BT2)
2. Explain the components of database system with a neat diagram(BT1)
3. Discuss about building blocks of Entity-Relationship diagram (BT1)

Part-B

4. What is data model? Write about relational data model (BT2)
5. Explain DDL, DML and DCL commands in SQL (BT1)
6. Write about while loop used in PL/SQL (BT1)

SECTION-II

Answer any FOUR Questions. Each question carries 5marks (4x5=20M)

7. Explain about objectives of DBMS (BT2)
8. What are the functions of DBA (BT1)
9. Explain about Aggregation (BT2)
10. Explain about i) Candidate key ii)Primary key iii)Foreign key (BT1)
11. What is SQL? Explain about different datatypes in SQL (BT1)
12. Explain about Aggregate functions in SQL (BT1)
13. Write about cursors in PL/SQL (BT2)

P R GOVT COLLEGE(AU TONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc(Major 5) Semester- III(W.E.F 2025-26)
Course: Database Management System

Question Bank

Unit-1

Essay Questions

1.	What is meant by DBMS? Explain advantages of DBMS.	BT1	CO1	PO1
2.	Explain about characteristics and drawbacks of File based system.	BT2	CO2	PO2
3.	Explain the components of database system with a neat diagram.	BT1	CO3	PO3
4.	Explain three schema architecture in detail.	BT2	CO3	PO3

Unit-2

1.	Discuss about building blocks of Entity-Relationship diagram.	BT2	CO1	PO1
2.	Explain ER modeling and advantages of ER modeling.	T2	CO2	PO2
3.	How reducing ER diagram to tables	T1	CO2	PO2

Unit-3

1.	What is data model? Write about relational data model.	BT1	CO1	PO1
2.	List out the CODD's Rules	T1	CO2	PO2
3.	Explain the operations of Relational Algebra	BT2	CO3	PO3
4.	What is Normalization? Explain the Normal forms.	BT3	CO3	PO3

Unit-4

1.	Explain about SQL commands.	BT1	CO1	PO1
2.	Write about SQL operators.	BT1	CO2	PO2
3.	Discuss about aggregate functions.	BT2	CO3	PO3
4.	Explain about join operations.	BT3	CO3	PO3

Unit-5

1.	What is PL/SQL? Write about structure of PL/SQL with example	BT1	CO1	PO1
2.	Write about conditional control statements used in PL/SQL	BT1	CO2	PO2
3.	Discuss about Cursors in PL/SQL	BT2	CO3	PO3

Short Answer Questions

Unit-1

1.	Explain about drawbacks of file-based system.	BT2	CO1	PO1
2.	Explain about DBMS	BT2	CO2	PO2
3.	Write about database approach.	BT1	CO3	PO3
4.	Distinguish between data and information.	BT3	CO1	PO1

Unit-2

1.	Explain about entity sets.	BT2	CO1	PO1
2.	Explain about attribute classification.	BT2	CO2	PO2

3.	Discuss about Relational degree.	BT2	CO3	PO3
4.	What isER modeling.	BT1	CO1	PO1

Unit-3

1.	Explain about relational model.	BT2	CO1	PO1
2.	Explain about i) Candidate key ii) Primary key iii) Foreign key	BT2	CO2	PO2
3.	Discuss about Relational algebra.	BT1	CO3	PO3
4.	Explain about BCNF.	BT1	CO1	PO1

Unit-4

1.	Write about datatypes in sql	BT2	CO1	PO1
2.	Explain about selection and projection operators.	BT1	CO2	PO2
3.	Write about data manipulation language (DML).	BT1	CO3	PO3

Unit-5

1.	Explain about operators in PL/SQL	BT2	CO2	PO2
2.	Discuss about datatypes in PL/SQL	BT1	CO3	PO3
3.	Discuss about cursors.	BT1	CO2	PO1

Mapping of COs with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

PRGOVERNMENTCOLLEGE(AUTONOMOUS),KAKINADA					
	PYTHON PROGRAMMING	**II B.Sc(IT) Major 6 Sem - III 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

CourseObjective
1.Understand the purpose of Python
2.Understand the syntax of Python programming language.
3.Apply python programming skills to solve problems.

CourseOutcomes

On completion of the course, the students will be able to-		
Outcome	**Description**	**CognitiveLevel**
CO1	Understand basic concepts of Programming	Knowledge
CO2	Understand why python is a useful scripting language for developers.	Knowledge
CO3	Understand programming constructs like selection And repetition.	Analysis and Evaluation
CO4	Use aggregated data(list,tuple,and dictionary).	Application
CO5	Interpret the concepts of Object-Oriented Programming as used in Python.	Creativity

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENTOFCOMPUTERAPPLICATIONS
II B. Sc – IT Semester – III (W.E.F. 2025-26)
PYTHON PROGRAMMING

SYLLABUS

UNIT I
Introduction to Python: Features of Python Language, installing Python, Environment Setup, python syntax, running a python script,Python2.xVsPython3.x,PythonProgrammingbasics:Literals,Data Types: Numeric data types: int, float, complex, string data type, python variables, Expressions, comment statements. Operators-Arithmetic operators, Assignment operators ,Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators

UNIT II
StandardI/OOperations,pythoncastingControlstatements-Conditionalbranching:if-else,nestedif, if-elif-else statements, Iterative statements: while loop, for loop, nested loops, pass statement, continue statement, break statement, and else statement used with loops, Programming using Python conditional and loops block

UNIT III
Functions: Introduction, function definition, creating a function, Function Calling, declaration and defining functions, variable scope and lifetime, built-in functions Sequences: Lists: Creating lists, accessing values in lists, list operations, Tuples: Creating Tuples, accessing values in Tuples, Tuple operations. Sets: Creating a set, accessing values in Set, Set operations, and Dictionaries: Creating a dictionary, Accessing values in Dictionary, Dictionary operations

UNIT IV
Strings and Regular expressions: Introduction to strings, String operations, Built-in string methods and functions, comparing strings, Functions in regular expressions. Object Oriented Programming: Classes and Objects, Class method and self arguments, The Init_Method ,Class Variables and Object Variables, The _Del_Method, Public and Private Data Members Private Methods, Built-In Functions to check, Get, Set and Delete class Attributes, Garbage Collection (Destroying Objects).

UNITV
Inheritance and Polymorphism: Inheriting Classes in Python, Polymorphism and Method overriding, Types of Inheritance, Composition/Containership, Abstract Classes and Interfaces, Exception Handling: Introduction, Handling exceptions, multiple except blocks and multiple exceptions, finally block.

III. REFERENCES:
TEXTBOOKS:

l."ReemaThareja",PythonProgrammingusingproblemsolvingapproach,FirstEdition,Oxford

higher Education.

REFERENCEBOOKS:

l.KennethA.Lambert,FundamentalsofPython

1. JamesPayne,BeginningPythonusingPython2.6andPython3

2. CharlesDierach,IntroductiontoComputerScienceusingPython

IV.SUGGESTEDCO-CURRICULARACTIVITIES:

1. Organizecodingcompetitionswherestudentscansolveprogrammingproblemsusing Python

2. EncouragestudentstocreatePython-basedprojectsandshowcasetheminaprojectexhibition.

3. Encouragestudentstocontributetoopen-

sourcePythonprojects.Thisactivityexposesthemto real-world codebases, collaborative

development practices, and the Python community.

PYTHONPROGRAMMING-PRACTICAL

1. Write a program to demonstrate different number datatypes in Python.
2. Write a program to perform different arithmetic operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing.
4. Write a Python Script to print the current date in the following format "SunMay2902:26:23IST 2017".
5. Write a program to create, append and remove lists in Python.
6. Write a program to demonstrate working with tuples in Python.
7. Write a program to demonstrate working with dictionaries in Python.
8. Write a Python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula:c/5=f 32/9]
10. WriteaPythonprogramtoconstructthefollowingpattern,usinganestedforloop

```
*
* *
* * *
* * * *
* * * * *
```

11. Write a Python Script that prints prime numbers less than 20.
12. Write a Python program to find a factorial of a number using Recursion.
13. Write a Python program to define a module to find Fibonacci numbers and import the module to another program.
14. WriteaPythonprogramtodefineamoduleandimportaspecificfunctioninthatmoduleto another program.
15. Write a Python class to convert an integer to a roman numeral.
16. Write a Python class to implement pow(x,n).
17. Write a Python class to reverse a string word by word

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

DEPARTMENT OF COMPUTER APPLICATIONS

MODEL BLUE PRINT(W.E.F.2025-26)

II B.SC- (IT) SEMESTER-III

SUBJECT: PYTHON PROGRAMMING **Time:2Hrs**
Marks:50

Modelblueprintforthemodel paperand choice

S.NO	Type of Question	TobegivenintheQuestion Paper			Tobe answered		
		No. of Questions	Marks allotted toeach questio n	Total Marks	No. of Questions	Marks allotted toeach questio n	Total Marks
1	Section-I Essay Questions	6	10	60	3	10	30
2	Section-II Short Questions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		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	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
Total No.of questions	6	7	
Total Marks Including choice			95

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENTOFCOMPUTERAPPLICATIONS
II B.Sc-IT Semester-III(W.E.F.2025-26)
MODELPAPER

SUBJECT:PYTHON PROGRAMMING **Time:2Hrs.**

Time: 2 Hrs. **SEMESTER-III** **Max.Marks:50**

SECTION-I

Answer Any Three Questions. Atleast One question from each part (3x10=30M)

Part-A

1. Illustrate the Features of Python Language?
2. Explain the Data types in Python?
3. Discuss Conditional statements in python?

Part-B

4. Define Function? Explain create a function and Function calling?
5. Define String?And Explain String Operations in Python
6. Define Inheritance? Explain the Types of Inheritance.

SECTION-II

AnsweranyFOURQuestions.Eachquestioncarries5marks (4x5=20M)

7. Demonstrate the process of installing python?
8. Describe about Literals?
9. Explain Standard I/O Operations?
10. Explain Break and continue statements?
11. Explain How to declare and defining functions?
12. Explain Class Variables and Object Variables.
13. Explain Abstract Classes and Interfaces.

P.R. GOVT.COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc. – IT Semester – III (W.E.F. 2024-25)
PYTHON PROGRAMMING
Question Bank

Essay Questions
UNIT-1

1.	Illustrate the Features of Python Language?	BT2	CO1	PO1
2.	Explain the Data types in Python?	BT2	CO2	PO2
3.	Explain the Operators in Python?	BT3	CO3	PO3

Unit-2

1.	Discuss about Conditional statements in python?	BT2	CO1	PO1
2.	Explain about Iterative statements in python?	BT1	CO2	PO2
3.	Explain Jumping Statements?	BT1	CO2	PO2

Unit-3

1.	Define Function? Explain create a function and Function calling?	BT1	CO1	PO1
2.	Define List? Explain List Operations?	BT2	CO2	PO2
3.	Define Tuples? Explain How to create Tuples and accessing values in Tuples.	BT2	CO3	PO3

Unit-4

4.	Define String? Explain String Operations in Python.	BT1	CO1	PO1
5.	Describe Oops and explain Classes and Objects?	BT1	CO2	PO2

Unit-5

1.	Define Inheritance? Explain the Types of Inheritance.	BT2	CO1	PO1
2.	Define Polymorphism? Explain Method Overriding concept with python Program?	BT3	CO2	PO2

Short Answer Questions
Unit-1

1.	Demonstrate the process of installing python?	BT2	CO1	PO1
2.	Describe about Literals?	BT1	CO2	PO2
3.	Explain Numeric data types in python?	BT1	CO3	PO3

Unit-2

1.	Explain Standard I/O Operations?	BT2	CO1	PO1
2.	Explain Break and continue statements?	BT2	CO2	PO2
3.	Describe about Pass statement?	BT1	CO3	PO3

Unit-3

1.	Explain How to declare and defining functions?	BT2	CO1	PO1
2.	Define a) Tuples b) Lists c)Dictionaries	BT2	CO3	PO3
3.	Explain Set and List Operations.	BT1	CO1	PO1

Unit-4

1.	Describe Built-in string methods	BT2	CO1	PO1
2.	Explain Class Variables and Object Variables.	BT2	CO2	PO2
3.	Discuss about Public and Private Data Members.	BT2	CO3	PO3

Unit-5

1.	Explain about Abstract Classes and Interfaces.	BT2	CO1	PO1
2.	Explain tryblock in Exception handling.	BT2	CO2	PO2
3.	Explain catch block in Exception handling.	BT1	CO3	PO3

Mapping of Cos with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	OPERATING SYSTEM	**II B.Sc(IT) Major7 Sem - III 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites	BasicComputerKnowledge	3	-	1	4

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.

CourseLearningOutcomes:
Uponsuccessful completion ofthecourse,astudentwill beableto: **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
8.security features design to guard against them.

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

DEPARTMENTOFCOMPUTERAPPLICATIONS

IIB.Sc-ITSemester-III(W.E.F.2025-26)

OPERATINGSYSTEMS

Syllabus

UNIT-I

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction,Types ofOperating Systems–Multiprogramming Systems,BatchSystems, 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 SystemPrograms,System View ofthe Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNITIII

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

UNITIV

Memory Management: PhysicalandVirtualAddressSpace;MemoryAllocationStrategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

UNITV

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.

Additionaltopic:

Introduction to Android Operating System, Android Development Framework, Android Application Architecture, Android Process Management and File System,

REFERENCEBOOKS:

1. OperatingSystemPrinciplesbyAbrahamSilberschatz,PeterBaerGalvinandGregGagne (7thEdition) Wiley India Edition.
2. OperatingSystems:InternalsandDesignPrinciplesbyStallings(Pearson)
3. OperatingSystems byJ.ArcherHarris(Author),JyotiSingh(Author) (TMH)
4. OnlineResources forUNITV

III Semester

OPERATING SYSTEMS

PRACTICAL

1. Write program to implement Round Robin CPU Scheduling algorithm
2. Simulate SJFCPU Scheduling algorithm
3. Write a program the FCFS CPU Scheduling algorithm
4. Write a program to Priority CPU Scheduling algorithm
5. Simulate Sequential file allocation strategies
6. Simulate Indexed file allocation strategies
7. Simulate Linked file allocation strategies
8. Simulate VT and Metamemory management techniques
9. Simulate Single level directory File organization techniques
10. Simulate Two level File organization techniques
11. Simulate Hierarchical File organization techniques
12. Write a program for Bankers Algorithm for Dead Lock Avoidance
13. Implement Bankers Algorithm Dead Lock Prevention.
14. Simulate all Pagere placement algorithms. a) FIFO b) LRU c) LFU
15. Simulate Paging Techniques of memory management

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

DEPARTMENTOFCOMPUTERAPPLICATIONS

II B.Sc-IT Semester-III(W.E.F.2025-26)

OPERATINGSYSTEMS

Time: 2Hrs **Marks: 50**

Model blue print for the model paper and choice

S.NO	TypeofQuestion	TobegivenintheQuestion Paper			Tobe answered		
		No. of Questions	Marks allotted toeach question	Total Marks	No. of Questions	Marks allotted toeach question	Total Marks
1	Section-I Essay Questions	6	10	60	3	10	30
2	Section-II ShortQuestions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		50

Model Blue print for the question paper Setter

ChapterName	EssayQuestions 10 Marks	ShortQuestions 5 Marks	Marksallotted tothe chapter
UNIT-I	2	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
TotalNo.of questions	6	7	
TotalMarksIncludingchoice			95

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
IIB.Sc-IT Semester-III (W.E.F.2025-26)
OPERATING SYSTEMS

Time:2Hrs **Max.Marks: 50**

SECTION –I

Answer any three of the following questions. Must attempt at least one question from each part. Each question carries 10 Marks. **3 X 10 = 30M**

Part-A

1. Define Operating system? Explain function of Operating System.[BT1]
2. Explain about Process Scheduling Algorithms indetail? [BT1]
3. Discuss about Dead lock Detection and recovery?[BT1]

Part-B

4. Categories various types of Operating Systems? [BT2]
5. Classify various types of Classical Process Synchronization problem? [BT2]
6. Describe Segmentation and Memory Allocation Strategies? [BT1]

SECTION -II

Answer any four of the following questions. Each question carries5marks. 4X5= 20M

7. Differentiate between Real Time System and Time sharing Operating System? [BT2]
8. Write about Resource Abstraction? [BT1]
9. Write about the Process and the Process state diagram?[BT1, BT3]
10. Explain Threading issues in os?[BT1]
11. Write about some necessary and sufficient conditions for Deadlock?[BT1]
12. Explain about Virtual memory?[BT1]
13. Write about file Operations?[BT1]

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

II B.Sc (IT) (W.E.F 2025-2026)

SEMESTER – III

QUESTION BANK

Subject: Operating Systems **Paper: 7**

Unit-1

Essay Questions

4.	**What is Operating system? Explain function of Operating System?**	**BT1**	**CO1**	**PO1**
5.	**Explain about Various types of Operating Systems?**	**BT2**	**CO2**	**PO2**
6.	**Explain about History and Evolution of operating System?**	**BT2**	**CO3**	**PO3**

Unit-2

1.	**Explain about Process Scheduling Algorithms in detail?**	**BT1**	**CO1**	**PO1**
2.	**Illustrate about System Call in detail?**	**BT2**	**CO2**	**PO2**
3.	**Explain about Thread Concept in detail?**	**BT2**	**CO3**	**PO3**

Unit-3

1.	**Explain about Deadlock concept in detail?**	**BT1**	**CO1**	**PO1**
2.	**Explain about Classical Process Synchronization problem?**	**BT2**	**CO2**	**PO2**
3.	**Explain about Deadlock Detection and recovery?**	**BT2**	**CO3**	**PO3**

Unit-4

1.	**Explain about Paging in Memory Management?**	**BT1**	**CO1**	**PO1**
2.	**Explain about Memory Allocation Strategies?**	**BT2**	**CO2**	**PO2**

Unit-5

1.	**What is file ? Explain about File Operations in detail?**	**BT1**	**CO1**	**PO1**
2.	**Explain about Directory Structure?**	**BT2**	**CO2**	**PO2**
3.	**Explain about Page Replacement Algorithm?**	**BT2**	**CO3**	**PO3**

Short Questions:

Unit-1

1.	**Explain about personal computers and handheld devices?**	**BT1**	**CO1**	**PO1**

2.	**Write a short note on Operating System?**	**BT2**	**CO2**	**PO2**
3.	**Explain about Process Control?**	**BT2**	**CO3**	**PO3**

Unit-2

1.	**What is Thread? Explain different types of Thread**	**BT1**	**CO1**	**PO1**
2.	**Explain about System Programs?**	**BT2**	**CO2**	**PO2**
3.	**Write about Threading Issues in OS?**	**BT2**	**CO3**	**PO3**

Unit-3

1.	**Explain about Deadlock characterization?**	**BT1**	**CO1**	**PO1**
2.	**Write about Semaphores?**	**BT2**	**CO2**	**PO2**
3.	**Describe about Reader-Writer problem?**	**BT2**	**CO3**	**PO3**

Unit-4

1.	**Discuss about Paging?**	**BT1**	**CO1**	**PO1**
2.	**Explain about Virtual Memory?**			
3.	**Write about Fixed and Variable Partitions?**	**BT2**	**CO2**	**PO2**

Unit-5

1.	**Write about File Operations?**	**BT1**	**CO1**	**PO1**
2.	**Discuss about File Concept in detail?**	**BT2**	**CO2**	**PO2**
3.	**Illustrate about File Allocation Methods?**	**BT2**	**CO2**	**PO2**

Mapping of Cos with POs/PSOs

CO /PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
Course Code	**COMPUTER ARCHITECTURE**	**II B.Sc- (IT) Major 8 Sem - III 2025-26**			
Hours	90 (60 Theory + 30 Practical)	L	T	P	C
Pre requisites		3	-	2	4

Course Objective
The objective of this course is to provide students 1.To understand the purpose of registers, register transfer language and instructions 2.To understand the Memory, addressing modes and Central processing unit 3.To understand the peripheral devices 4.To understand arithmetic operations through algorithms

Course Outcomes	
Students after successful completion of the course will be able to:	
CO1	1. Identify different types of instructions
CO2	2. Differentiate between micro-programmed and hard-wired control units.
CO3	3. Analyse the performance of hierarchical organization of memory.
CO4	4. Summarize different data transfer techniques.
CO5	5. Demonstrate arithmetic operations on fixed- and floating-point numbers and illustrate concepts of parallel processing.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- III(2025-26)
COMPUTER ARCHITECTURE
SYLLABUS.

UNIT I
Register Transfer Language and Micro Operations: Introduction- Functional units, computer registers, register transfer language, register transfer, bus and memory transfers, arithmetic, logic and shift micro-operations, arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, instruction cycle. Register reference instructions, Memory – reference instructions, input – output and interrupt.

UNIT II
CPU and Micro Programmed Control: Central Processing unit: Introduction, instruction formats, addressing modes. Control memory, address sequencing, design of control unit - hard wired control, micro programmed control.

UNIT III
Memory Organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache Memory and mappings.

UNIT IV
Input-Output Organization: Peripheral Devices, input-output interface, asynchronous data transfer, modes of transfer- programmed I/O, priority interrupt, direct memory access, Input –Output Processor (IOP).

UNIT V
Computer Arithmetic and Parallel Processing: Data representation- fixed point, floating point, addition and subtraction, multiplication and division algorithms. Parallel Processing-Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline.

REFERENCES TEXT BOOK:

1. Computer Organization – Carl Hamacher, Zvonko G- Vranesic, Safwat G, Zaky Fifth Edition, Mc- Grawhill INC..,

REFERENCES

1.MansafAlam& Bashir Alam: Digital Logic Design. PHI
2. M. Morris Mano: Digital Logic and Computer Design. Pearson
3. M. Morris Mano: Computer System Architecture. Pearson
4. Rajaraman& T. Radhakrishnan: Computer Organization and Architecture. PHI
5. Donald D. Givone: Digital Principles and Design. McGraw Hill

SUGGESTEDCO-CURRICULARACTIVITIES:
1. Assignments
2. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
3. Presentation by students on applications related to Graph Theory

COMPUTER ARCHITECTURE – PRATICAL

1. Implement a C program to convert a Hexadecimal, octal, and binary number to decimal number vice versa.
2. Implement a C program to perform Binary Addition & Subtraction.
3. Implement a C program to perform Multiplication of two binary numbers.
4. Implement arithmetic micro-operations using logic gates.
5. Implement logic and shift micro-operations using logic gates.
6. Implement a C program to perform Multiplication of two binary numbers (signed) using Booth‘s Algorithms.
7. Implement a C program to perform division of two binary numbers (Unsigned) using restoring division algorithm.
8. Implement a C program to perform division of two binary numbers (Unsigned) using nonrestoring division algorithm.
9. Write assembly language code for A+B*(C-D) using various instruction formats in MASM

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

II B.Sc (IT) Semester- III (2025-26)

COMPUTER ARCHITECTURE

Marks: 50M

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 Essay Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-B Short Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

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

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**	**2**	**30**
UNIT -II	**1**	**2**	**20**
UNIT -III	**1**	**1**	**15**
UNIT -IV	**1**	**1**	**15**
UNIT -V	**1**	**1**	**15**
Total No. of questions	**6**	**7**	
Total Marks Including choice			**95**

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- III (2025-26)
COMPUTER ARCHITECTURE

MODEL PAPER

Time : 2Hrs **SEMESTER-II** **Max. Marks: 50**

SECTION-I

Answer Any Three Questions. At least One question from each part (3x10=30M)

Part-A

1. Explain the concept of functional units in computer organization
2. What are addressing modes in the design of a CPU?
3. What is Direct Memory Access (DMA) and how does it improve data transfer efficiency?

Part-B

4. How are bus and memory transfers crucial in computer organization?
5. What is the purpose of a memory hierarchy in a computer system?
6. Describe the multiplication algorithm for fixed point numbers.

SECTION-II

Answer any FOUR Questions. Each question carries 5 marks (4x5=20M)

7. What is the role of computer registers in a CPU?
8. Describe the stages involved in the instruction cycle of a CPU.
9. How do different instruction formats affect the operation of a CPU?
10. How is control memory utilized in a CPU?
11. How does main memory differ from auxiliary memory?
12. How does a priority interrupt work in a computer system?
13. Differentiate between arithmetic and instruction pipeline in parallel processing

P.R. GOVT. COLLEGE (A), KAKINADA
II B.Sc (IT) (W.E.F 2025-2026)
SEMESTER – III
QUESTION BANK

Subject: Computer Architecture **Paper: 8**

MODULE-I

Essay Questions:

1. Explain the concept of functional units in computer organization
2. Define register transfer language (RTL) and its significance in computer design.
3. How are bus and memory transfers crucial in computer organization?
4. What are arithmetic, logic, and shift micro-operations in CPU execution?

Short Questions:

5. What is the role of computer registers in a CPU?
6. How do instruction codes impact basic computer organization and design?
7. Describe the stages involved in the instruction cycle of a CPU.
8. What distinguishes register reference instructions from memory-reference instructions?

MODULE-II

Essay Questions:

1. What is the purpose of the Central Processing Unit (CPU) in a computer system?
2. What are addressing modes in the design of a CPU?
3. What is address sequencing, and why is it important in CPU design?

Short Questions:

4. How do different instruction formats affect the operation of a CPU?
5. How is control memory utilized in a CPU?
6. How do addressing modes and instruction formats interact in determining the performance of CPU?

MODULE-III

Essay Questions:

1. What is the purpose of a memory hierarchy in a computer system?
2. What is associative memory in the context of computer systems?
3. What are the different types of memory mappings used in computer systems?

Short Questions:

4. Why is it important to consider the size and associativity of cache memory in system design?
5. What role does virtual memory play in modern computer systems?
6. How does the use of memory hierarchy contribute to the overall efficiency of a computer system?
7. How does main memory differ from auxiliary memory?

MODULE-IV

Essay Questions:

1. What is the purpose of Peripheral Devices in a computer system?
2. What is asynchronous data transfer? Explain in-detail.
3. What is Direct Memory Access (DMA) and how does it improve data transfer efficiency?

Short Questions:

4. Explain the concept of input-output interface in the context of computer systems.
5. How does a priority interrupt work in a computer system?
6. How does the mode of transfer affect the efficiency of data transfer in a computer system?

MODULE-V

Essay Questions:

1. Describe the multiplication algorithm for fixed point numbers.
2. What is the division algorithm for floating point numbers?
3. Explain the concept of pipelining in parallel processing.

Short Questions:

4. Differentiate between arithmetic and instruction pipeline in parallel processing.
5. How does parallel processing impact the speed and efficiency of data processing tasks?
6. Explain the difference between fixed point and floating point data representation.

Mapping of Cos with POs/PSOs

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1															
CO2															
CO3															
CO4															
CO5															

SEMESTER-4

PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
Course Code	**WEB TECHNOLOGIES**	**II B.Sc- (IT) Major 9 Sem - IV 2025-26**			
Hours	90 (60 Theory + 30 Practical)	L	T	P	C
Pre requisites		3	-	2	4

Course Objective
The objective of this course is to provide students 1. To understand the web architecture and web services 2. To practice latest web technologies and tools by conducting experiments 3. To design interactive web pages using HTML and Style sheets. 4.To study the framework and building blocks of Integrated Development Environment 5..To provide solutions by identifying and formulating IT related problems.

Course Outcomes	
Students after successful completion of the course will be able to:	
CO1	1 . understand the web architecture and web services
CO2	2. practice latest web technologies and tools by conducting experiments.
CO3	3. design interactive web pages using HTML and Style sheets.
CO4	4. study the framework and building blocks of Integrated Development Environment
CO5	5. To provide solutions by identifying and formulating IT related problems.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

II BSc(Information Technology)- Semester- IV (2024-25)

Web Technologies

SYLLABUS

UNIT I

Internet Language, Understanding HTML, HTML document structure, Create a Web Page, Publishing HTML Pages, Tags in HTML, title tag, Text Alignment tags, Text Formatting tags, heading tags, horizontal rule tag, paragraph tag, break tag.HTML Lists - Ordered List, Unordered List & Definition List – Using colors – Using Images

UNIT II

Horizontal Rule Tag - HTML Tables – Nested Tables - Hyperlinks: Textual, Graphical Links to sections – Multimedia Objects – Frames – Nested Frames – Forms – Form Controls: textbox, password, checkbox, radio button, select, text area - Processing of forms

UNIT III

JavaScript- Introduction, simple programming, Obtaining User Input with prompt Dialogs, Operators (arithmetic, Decision making, assignment, logical, increment and decrement) Control Structures - if… else selection statement, while, do… while repetitions statement, for statement, switch statement, break and continue statements.

UNIT IV

Functions – program modules in JavaScript, programmer defined functions, function definition, scope rules, global functions, and recursion JavaScript: Arrays, declaring arrays, accessing elements of an array.

UNIT V

Cascading Style Sheets: Introduction – Using Styles: As an attribute, tag & external file –Defining your own styles Properties and values: properties related to Fonts, Backgrounds & colors, text, boxes & borders
Formatting blocks of information: Classes - Divisions – Spans - Layers with suitable examples.

III.REFERENCES:

TEXT BOOK:
1. Internet & World Wide Web - H.M.Deitel, P.J.Deitel, A.B.Goldberg-5th Edition
REFERENCE BOOKS
1. Programming Worldwide Web by RW Sebesta (Pearson)
2. An Introduction to Web Design + Programming by Wang & Katia (Pearson)
3. HTML & XML An Introduction NIIT(PHI)
4. HTML for the WWW with XHTML & CSS by Wlizabeth Castro (Pearson)
5. Fundamentals of the Internet and the World Wide Web by Raymond Green Law And Ellen Hepp (TMH)
6. Internet and Web Technologies by RajKamal(TMH)
7. Internet and WebBasics by NedSnell,BobTemple,TMClark(Pearson)

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
MODEL BLUE PRINT
II BSc (Information Technology) SEMESTER-IV (W.E.F. 2024-25)

SUBJECT: Web Technologies

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 Essay Questions	6	10	60	3	10	30
2	Section-B Short Questions	7	5	35	4	5	20
TOTAL		13		95	TOTAL MARKS		50

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

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	2	30
UNIT -II	1	2	20
UNIT -III	1	1	15
UNIT -IV	1	1	15
UNIT-V	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

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

DEPARTMENT OF COMPUTER APPLICATIONS

MODEL PAPER (W.E.F. 2024-25)

II BSc(Information Technology) Semester -IV

SUBJECT: Web Technologies **PAPER-9**

Time : 2 Hrs. **SEMESTER-IV** **Max. Marks: 50**

SECTION-I

Answer Any Three Questions. At least One question from each part (3x10=30M)

Part-A

1. Define HTML? Explain the structure of HTML document with example program?.
2. Explain various Text alignment tags and text formatting tags in HTML
3. Illustrate the forms and form controls?

Part-B

4. Explain about operations in java script?
5. Define array? Explain briefly about declaring and accessing elements of an array?
6. Illustrate the formatting blocks of information?

SECTION-II

Answer any FOUR Questions. Each question carries 5 marks (4x5=20M)

7. Explain various Text alignment tags in HTML?
8. Illustrate the horizontal rule tag and break tag in HTML?.
9. What are the paired and unpaired tags in HTML?.
10. Explain breifly about variables and data types in javascript?
11. Discuss about the program modules in JavaScript?
12. What are the types of scope rules in JavaScript?
13. Explain breifly about layers in css with suitable examples?.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

II BSC(IT) _Semester- IV(W.E.F 2024-25)

Course: WEB TECHNOLOGIES

Question Bank

Unit-1

Essay Questions

1.	Define HTML? Explain about the structure of HTML document with example program?	BT2	CO1	PO1
2.	Define HTML List ? and What are the different types of lists in HTML with an example?	BT2	CO2	PO2
3.	Explain various Text alignment tags and text formatting tags in HTML?	BT3	CO3	PO3

Unit-2

1.	Illustrate the forms and form controls?	BT3	CO1	PO1
2.	Explain briefly about Hyperlinks and different types of links in HTML?	BT2	CO2	PO2
3.	Discuss about HTML Tables and Nested Tables with example?	BT2	CO3	PO3

Unit-3

1.	Explain about operations in javascript?	BT2	CO1	PO1
2.	Discuss breifly about control structure in javascript?	BT3	CO2	PO2

Unit-4

1.	What are functions and program modules in JavaScript?	BT2	CO1	PO1
2.	Define array? Explain briefly about declaring and accessing elements of an array?	BT2	CO2	PO2

Unit-5

1.	Define CSS? And Explain briefly about the different types of CSS with examples?	BT2	CO1	PO1
2.	Illustrate the formatting blocks of information?	BT2	CO2	PO2

Short Answer Questions

Unit-1

1.	Explain various Text alignment tags in HTML?	BT2	CO1	PO1
2.	What are the paired and unpaired tags in HTML?	BT1	CO2	PO2
3.	Discuss briefly about heading tags and Text formatting tags?	BT2	CO3	PO3

Unit-2

1.	Illustrate the horizontal rule tag and break tag in HTML?	BT3	CO1	PO1
2.	What are the frames and nested frames?	BT1	CO2	PO2
3.	Discuss about HTML Tables?	BT2	CO1	PO1

Unit-3

1.	Define JavaScript? Discuss about the features of JavaScript with simple program?	BT2	CO1	PO1

2.	Explain breifly about variables and data types in javascript?	BT2	CO2	PO2
3.	What is the difference between if and if-else statements?	BT1	CO1	PO1

Unit-4

1.	What are the types of scope rules in JavaScript?	BT2	CO1	PO1
2.	Discuss about the program modules in JavaScript?	BT2	CO3	PO3

Unit-5

1.	What are the properties related to fonts, background and colors?	BT2	CO2	PO2
2.	Explain breifly about layers in css with suitable examples?	BT1	CO3	PO3

P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA	**II B.Sc(IT) Sem-IV Major 10 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites	BasicComputerKnowledge	3	-	1	4

Course Objective
On completion of this course, a student will be familiar with client server architecture and able to develop a web application using java technologies. Students will gain the skills and project-based experience needed for entry into web application and development careers.

Course Outcomes

Outcome	Description	Cognitive Level
CO1	1.Implement Object Oriented Programming concepts in Python.	Knowledge
CO2	2.UnderstandLists,DictionariesandRegularexpressions in Python.	Knowledge
CO3	3.Understandinghowsearchingandsortingisperformedin Python.	Analysis and Evaluation
CO4	4.Understandinghowlinearandnon-lineardatastructures works.	Application
CO5	5.TolearnthefundamentalsofwritingPythonscripts.	Creativity

P R GOVT COLLEGE (AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

II B.Sc (IT)Semester- IV (W.E.F.2025-26)

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

SYLLABUS

UNIT-I

Introduction to Java: Features of Java, The Java virtual Machine, Structure of Java Program, Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals Operators in Java: Operators

Control Statements in Java: if... else Statement, do... while Statement, while Loop, for Loop, for each loop, switch Statement, break Statement, continue Statement, return Statement **Input and Output**: Accepting Input from the Keyboard: Reading Input with Scanner and Buffered Reader class, Displaying Output with System. out. Printf (), Displaying Formatted Output with String. format()

UNIT-II

Arrays: Types of Arrays, array name. length, Command Line Arguments Strings: Creating Strings, String Class Methods. **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, The keyword 'this', Instance Methods.

UNIT-III

Inheritance: Inheritance, The keyword 'super', The Protected Specifier, Types of Inheritance **Polymorphism:** Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Final Methods, final Class Type Casting: 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, Interfaces in a Package

UNIT-IV

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re–throwing an Exception **Streams**: Stream, Creating a File using File Output Stream, Reading Data from a File uing File Input Stream, Creating a File using File Writer, Reading a File using File Reader.

UNIT– V

Threads: Introduction, Thread Life Cycle, Creating a Thread and Running it, Terminating the Thread.

Applets: Introduction, Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, Applet Parameters.

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Stages in a JDBC Program,

REFERENCES TEXT

BOOKS:

1. CoreJava:AnIntegratedApproach,AuthoredbyDr.R.NageswaraRao&Kogent Learning Solutions Inc.
2. E.Balaguruswamy,ProgrammingwithJAVA,Aprimer,3e,TATAMcGraw-Hill Company
3. JohnR.Hubbard,ProgrammingwithJava,SecondEdition,Schaum'soutlineSeries,TMH.
4. Deitel&Deitel.JavaTM:HowtoProgram,PHI(2007)

SUGGESTEDCO-CURRICULARACTIVITIES:

2. Conductcodingcompetitionsfocusedonobject-orientedprogrammingconceptsinJava
3. Providestudents withreal-worldscenariosandaskthemtosolvethegivenproblems.

4. Assigngroupprojectsthatrequirestudentstoworktogethertocreate Javaprogramsusing OOP concepts

Course10: Object Oriented Programming through Java **Credits -1**

OBJECT ORIENTATED PROGRAMMING THROUGH JAVA-

PRACTICAL

1. WriteaprogramtoreadStudentName,Reg.No,Marks[5]andcalculateTotal,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 sub string or not
    c. Compare existing string by another string and display status
    d. Replace existing string character with another character
    e. Count number of characters in a string
3. Java program to implements Addition and Multiplication of two NXN matrices.
4. Java program to demonstrated use of Constructor.
5. Calculate area of the following shapes using method overloading.
    a. Triangle
    b. Rectangle
    c. Circle
    d. Square
6. Implement inheritance between Person (Aadhar,Surname,Name,DOB,andAge) and Student (Admission Number, College, Course, Year)classeswhere read Data(),displayData()are overriding methods.
7. Java program for implementing Interfaces
8. Java program on Multiple Inheritance.
9. Java program for to display Serial Number from 1toN by creating twoThreads
10. Java program to demonstrate the following exception handlings
    a. Dividedby Zero
    b. ArrayIndexOutofBound
    c. ArithmeticException
    d. UserDefinedException
11. CreateanApplettodisplaydifferentshapessuchasCircle,Oval,Rectangle,Squareand Triangle.
12. WriteaprogramtocreateBook(ISBN,Title,Author,Price,Pages,Publisher)tableand perform

Thefollowing operations

    a. Addbook details
    b. SearchabookdetailsforagivenISBNanddisplaybookdetails,ifavailable
    c. Updateabook detail usingISBN
    d. Deletebookdetailsfora given ISBNanddisplaylist ofremainingBooks

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS

II B.Sc- IT SEMESTER-IV (W.E.F.2025-26)

SUBJECT:OOP'S THROUGH JAVA **Time:2Hrs**
Marks: 50

Model blue print for the model paper and choice

S.NO	TypeofQuestion	TobegivenintheQuestion Paper			Tobe answered		
		No. of Questions	Marks allotted toeach question	Total Marks	No. of Questions	Marks allotted toeach question	Total Marks
1	Section-I Essay Questions	6	10	60	3	10	30
2	Section-II Short Questions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		50

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

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	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
TotalNo.of questions	6	7	
Total Marks Including choice			95

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT)Semester- IV (2025-26)
OOP'S THROUGH JAVA

MODEL PAPER

Time:2Hrs **Max .Marks: 50**

SECTION-I

Answer Any Three Questions. Atleast One question from each part (3x10=30M)

Part-A

1. Explain the features of Java?.
2. What is an operator? Explain types of operators?.
3. Explain different Loop statements available in Java.

Part-B

4. What is Inheritance? Explain Different types of Inheritance in Java.
5. What is a package? Explain the process of creating and using packages?
6. Explain how exception handling is done in java.

SECTION-II

Answer any FOUR Questions. Each question carries5 marks (4x5=20M)

7. What are the data types supported by Java?
8. What are the applications of OOPs?
9. What is the difference between break and continue statements in java.
10. List and explain any five String class methods in java
11. Explain about access specifiers in java?
12. Explain about thread priority?
13. Define local and remote applets

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	Data Structures Using Python	**II B.Sc(IT) Sem-IV Major-11 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

Course Objective

1. Implement Object Oriented Programming concepts in Python.
2. Understand Lists, Dictionaries and Regular expressions in Python.
3. Understanding how searching and sorting is performed in Python
4. Understanding how linear and non-linear data structures works.
5. To learn the fundamentals of writing Python scripts.

Course Outcomes

On completion of the course, the students will be able to-

Outcome	**Description**	**CognitiveLevel**
CO1	Implement Object Oriented Programming concepts in Python	Knowledge
CO2	Understand Lists, Dictionaries and Regular expressions in Python	Knowledge
CO3	Understanding how searching and sorting is performed in Python	Analysisand Evaluation
CO4	Understanding how linear and non-linear data structures works.	Application
CO5	learn the fundamentals of writing Python scripts.	Creativity

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

B.Sc. – IT Semester – IV (W.E.F. 2025-26)

Data Structures Using Python

SYLLABUS

UNITI

Object Oriented Programming: Goals, Principles, and Patterns, Software Development, Class Definitions, Inheritance, Namespaces and Object Orientation, Array based Sequences: Python's Sequence Types, Low-Level Arrays, Dynamic Arrays and Amortization

UNITII

Stacks: The Stack ADT ,Simple Array-Based Stack Implementation Queues: The Queue ADT, Array-Based Queue Implementation Double-Ended Queues: The Deque ADT, Implementing a Deque with a Circular Array

UNITIII

Linked Lists Singly Linked Lists - Implementing a Stack with a Singly Linked List, implementing a Queue with a Singly Linked List. Circularly Linked Lists-Implementing a Queue with a Circularly Linked List Doubly Linked Lists - Basic Implementation of a Doubly Linked List

UNIT– IV

Tree: General Trees - Tree Definitions and Properties, The Tree Abstract Data Type; Binary Trees-TheBinaryTreeAbstractDataType,PropertiesofBinaryTrees;ImplementingTrees- Linked Structure for Binary Trees, Array-Based Representation of a Binary Tree, Linked Structure for General Trees; Tree Traversal Algorithms – Preorder, In order and Post order Traversals, Implementing Tree Traversals in Python

UNIT–V

Graph Algorithms: Graphs, The Graph ADT, Data Structures for Graphs-Edge List Structure, Adjacency List Structure, Adjacency Map Structure, Adjacency Matrix Structure, Python Implementation of Graph Traversals-Depth-First Search, Breadth-First Search; Minimum Spanning Trees - Prim-Jarn´ık Algorithm, Kruskal's Algorithm

III. REFERENCES

TEXT BOOKS:

1. DatastructuresandAlgorithmsinPython,M.T.Goodrich,R.TomassiaandMichaelH. Goldwasser, Wiley Student Edition.
2. DatastructuresandAlgorithmsusingPython,RanceD.Necaise,WileyStudentEdition.

REFERENCEBOOKS:

1. Introduction to Programming in Python, Robert Sedge wick, Kevin Wayneand Robert Dondero, Pearson.
2. Python Programming, Sheetal Tanejaand Naveen Kumar, Pearson.

3. Exploring Python, Timothy A.Budd, TataMcGraw-HillEdition.
4. Think Python, AllenDowney,O'Reilly's.
5. Python Programming, Renanthera, OxfordUniversityPress.

IV.RECOMMENDEDCO-CURRICULARACTIVITIES:

1. Organizecodingcompetitionsonimplementingandsolvingdatastructureproblemsusing Python

2. Assignmentstoreinforcetheunderstandingofdifferentdatastructuresandtheiroperations.

3. Individual or group projects that requires students to implement specific data structures using Python

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENTOFCOMPUTERAPPLICATIONS II B.Sc
– IT Semester – IV (W.E.F. 2025-26)

Data Structures Using Python

PRACTICAL

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 Programs to implement the Stack operations using an array
3. Write Programs to implement the Stack operations using LinkedList.
4. Write Programs to implement the Queue operations using an array.
5. Write Programs to implement the Queue operations using Linked List.
6. Write a program for Binary Search Tree Traversals
7. Write a program to implement dequeuer using a doubly linked list.
8. Write a program to search an item in a given list using Binary Search
9. Write a program for implementation of the Quicksort
10. Write a program for implementation of Insertion sort
11. Write a program to implement DFS graph traversals algorithm
12. Write a program to implement BFS graph traversals algorithm

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

DEPARTMENT OF COMPUTER APPLICATIONS

MODEL BLUE PRINT(W.E.F.2025-26)
II*B.Sc- (IT) SEMESTER-IV*

SUBJECT: Data Structures Using Python **Time:2Hrs**
Marks: 50

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			Tobe answered		
		No. of Questions	Marks allotted toeach question	Total Marks	No. of Questions	Marks allotted toeach question	Total Marks
1	Section-I Essay Questions	6	10	60	3	10	30
2	Section-II Short Questions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		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	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
Total No.of questions	6	7	
Total Marks Including choice			95

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

MODEL PAPER(W.E.F.2025-26)

II B.Sc-IT Semester-IV

SUBJECT: Data Structures Using Python **Time:2Hrs**

Time: 2 Hrs. **SEMESTER-lV** **Max. Marks: 50**

SECTION-I

Answer Any Three Questions. Atleast One question from each part (3x10=30M)

Part-A

1. Explain Featuresof OOPs.
2. Explain Principles, and Patterns of OOPs.
3. Define Stack? Explain The Stack ADT?

Part-B

4. Explain Implementing a Stack with a Singly LinkedList.
5. Define Tree? And Explain Properties of a Tree.
6. Define Graph? Explain Graph ADT.

SECTION-II

AnsweranyFOURQuestions.Eachquestioncarries5marks (4x5=20M)

7. Describe Inheritance.
8. Describe about Namespaces and Object Orientation?
9. Explain Simple Array-Based Stack Implementation Queues.
10. Explain Array-Based Queue Implementation Double-Ended Queues?
11. Explain Implementation of a Doubly Linked List.
12. Describe Linked Structure for Binary Trees
13. Explain Adjacency Map Structure.

Mapping of COs with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

SEMESTER-5

PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
Course Code	**R Programming**	**III B.Sc- (IT) Major 12 Sem - V 2025-26**			
Hours	90 (60 Theory + 30 Practical)	L	T	P	C
Pre requisites	Basic Knowledge of Computer	3	-	2	4

Course Objective
The objective of this course is to provide students 1.To understand installation of R, variable names and operators in R 2.To understand control structures, data structures of R 3.To understand vectors and their operations 4.To understand Matrices, Lists, Data frames etc

Course Outcomes	
Students after successful completion of the course will be able to:	
CO1	1. Gain a solid understanding of R programming language
CO2	2. Acquire knowledge on various data structures and control structures in R.
CO3	3Perform vectorized operations in R programming.
CO4	4. Develop skills in manipulating and transforming vectors, matrices, arrays and lists in R.
CO5	5. Explore and analyze data using data frames and tables.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

III B.Sc (IT) Semester- V(2025-26), Major 12

R-PROGRAMMING

SYLLABUS

UNIT I

Introduction to R: R overview and history, Basic features of R, Benefits of R, data types inR, Installing R, Getting started with the RStudio IDE, Running R, Packages in R, variable names and assignment, operators, Input/output functions, reading and writing data.

UNIT II

Control structures: Conditional statements, Loops, dates and times, functions, String manipulations. Preview of Some Important R Data Structures: Vectors, Character Strings, Matrices, Lists, Data Frames, and Classes.

UNIT III

Vectors: Scalars,Vectors,Arrays and Matrices: Adding and Deleting Vector Elements, Obtaining the Length of a Vector Common vector operations: Arithmetic & logical operations, Vector Indexing, Generating vector sequences with seq(),Repeating vector constants with rep (), using all () and any () functions, Vectorized operations, NA and NULL values.

UNIT IV

Matrices and Arrays: Creating Matrices, General Matrix operations-linear algebra operations, matrix indexing, filtering on matrices, using apply () function , Add and Delete matrix rows and columns. Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List ,Accessing List Components and Values, Using l apply()and apply()functions.

UNIT-V

Data Frames: Creating Data Frames, Accessing Data Frames-Other Matrix-Like Operations: Extracting sub data frames, using r bind()and c bind()functions.

Factors and Tables : Factors and Levels - Common Functions Used with Factors : t apply() ,split() and by() - Working with Tables, Matrix/Array-Like Operations on Tables, Extracting a Sub table-Math Functions: aggregate()and cut()functions.

III. REFERENCES :

TEXTBOOKS:

1. TheArt of R Programming by Norman Matlof, Nostarch press, sanfransisco,2011.
2. An Introduction to R for Beginners by SASHA HAFNER,on AUG-2019

REFERENCE BOOKS:

1. R Programming for Dummies, AndriedeVries and JorisMeys, Wiley
2. R for Data Science, Hadley Wickham, Garrett Grolemund ,O'Reilly Media
3. R Programming: AStep-By-StepGuideforAbsoluteBeginners-2ndEdition,DanielDanielBell
4. LearnRprogrammingin1Day, KrishnaRungta, PublishedbyGuru99

IV.SUGGESTEDCO-CURRICULARACTIVITIES:

1. Assign students real-world data analysis projects that require them to apply their programming skills.
2. Organize coding challenges focused on R Programming.
3. Organize guest lectures or workshops.

4. William Stalling: Computer Organization and Architecture. Prentice Hall
5. Rajaraman& T. Radhakrishnan: Computer Organization and Architecture. PHI
6. Donald D. Givone: Digital Principles and Design. McGraw Hill

V Semester

Course 12: R Programming Practical

1) Write an R Program to take in put from user.
2) Write an R Program to demonstrate working with operators (Arithmetic, Relational, Logical, Assignment operators).
3) Write an R Program to Check if a Number is Odd or Even
4) Write an R Program to check if the given Number is a Prime Number
5) Write an R Program to Find the Factorial of a Number
6) Write an R Program to Find the Fibonacci sequence Using Recursive Function
7) Write an R Program to create a Vector and to access elements in a Vector
8) Write an R Program to create a Matrix from a Vector using dim()function.
9) Write an R Program to create a List and modify its components.
10) Write an R Program to create a Data Frame.
11) Write an R Program to access a Data Frame like a List.
12) Write an R Program to create a Factor

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER APPLICATIONS

III B.Sc (IT) Semester- V (2025-26)

R-PROGRAMMING

Marks: 50M

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 Essay Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-B Short Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

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

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**	**2**	**30**
UNIT -II	**1**	**2**	**20**
UNIT -III	**1**	**1**	**15**
UNIT -IV	**1**	**1**	**15**
UNIT -V	**1**	**1**	**15**
Total No. of questions	**6**	**7**	
Total Marks Including choice			**95**

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
III B.Sc (IT) Semester- V (2025-26)

R-PROGRAMMING

MODEL PAPER

Time : 2Hrs **SEMESTER-V** **Max. Marks: 50**

SECTION-I

Answer Any Three Questions. At least One question from each part (3x10=30M)

Part-A

1. How do you install a package in R programming?
2. Explain about Looping statements in R Programming with examples
3. What is a Vector? Explain about vector operations in R programming with an examples?

Part-B

4. Explain the basic features of R Programming Language
5. Explain about list operations with an examples.
6. What is a Data Frame? Explain the functions of a Data Frame.

SECTION-II

Answer any FOUR Questions. Each question carries 5 marks (4x5=20M)

7. What are the Data types available in R language?
8. What are the advantages of R-programming language?
9. Write about next and break in R programming?
10. Write about character strings in R programming?
11. Explain about adding and deleting vector elements. With an examples
12. How to create matrix in R programming?
13. Define the factors. give an example?

P.R. GOVT. COLLEGE (A), KAKINADA
III B.Sc (IT) (W.E.F 2025-26)
SEMESTER – V
QUESTION BANK

Subject: R – Programming **Paper: 12**

MODULE-I

Essay Questions:

1. Explain the basic features of R Programming Language
2. Explain the installation procedure of R and R Studio IDE?
3. Explain Different types of Operators ((arithmetic, logical, relational and , assignment operators) in R Language with examples?
4. How do you install a package in R programming?

Short Questions:

5. What are the Data types available in R language?
6. Explain Relational operators in R language.
7. Write about input/output functions in R?
8. How do you assign a variable in R-programming?
9. What are the advantages of R-programming language?

MODULE-II

Essay Questions:

1. Explain about Looping statements in R Programming with examples
2. What are the Conditional Statements available in R Programming? Explain with examples?
3. Write about string manipulation functions that are available in R Programming.

Short Questions:

4. Write a while control structure in a R programming with an example?
5. Write about next and break in R programming?
6. How to declare the date and time functions in R programming?
7. Write about character strings in R programming?

MODULE-III

Essay Questions:

1. What is a Vector? Explain about vector operations in R programming with an examples.

2. Explain about any five functions related to vectors in R programming
3. Explain about arithmetic and logical operations on vectors?

Short Questions:

4. How to find the length of a vector with an example?
5. How to extracting elements of a vector using subscripts?
6. Explain about adding and deleting vector elements. With an examples
7. Explain about generating sequences in R programming

MODULE-IV

Essay Questions:

1. Write about matrix operations in R programming?
2. Explain about list operations with an examples.
3. Explain about creating and adding of elements to the list give an example?

Short Questions:

4. How to create the list in R programming?.
5. How to create matrix in R programming?
6. Explain about accessing and deleting elements from the list give an example?
8. How to find the size of a list with an example?

MODULE-V

Essay Questions:

1. What is a Data Frame? Explain the functions of a Data Frame.
2. Explain about factor operations in R?
3. Explain about mathematical functions in R..

Short Questions:

4. How to create data frames in a R programming?
5. How to access the elements from the data frame in R programming?
6. Define the factors. give an example?

7. Write about generating factor levels in R programming

Mapping of Cos with POs/PSOs

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1															
CO2															
CO3															
CO4															
CO5															

P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
Course Code M-13	**SoftwareEngineering**	**III B.Sc.(IT) Major -13 Sem-V 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites	BasicComputerKnowledge	3	-	1	4

CourseObjective

1. Understand the basics of OOPs properties
2. Understand the phases of software engineering.
3. Apply the life cycle process of software engineering to the real time applications

CourseOutcomes

On completion of the course, the students will be able to-		
Outcome	**Description**	**CognitiveLevel**
CO1	Understand and apply the fundamental principles of Object-Oriented Programming (OOP) concepts and Unified Modeling Language (UML) basics, in the development of software solutions.	Knowledge
CO2	Analyze and specify software requirements, develop use cases and scenarios, apply object-oriented Analysis and design(OOAD)principles	Knowledge
CO3	Familiar with the concept of test-driven development (TDD) and its practical implementation	Analysisand Evaluation
CO4	Analyze and Evaluate Software Maintenance and Evolution Strategies	Application
CO5	Apply Advanced Object-Oriented Software Engineering	Creativity

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc.–IT Semester–V(W.E.F.2025-26)

Software Engineering

SYLLABUS

UNIT-I

Introduction to Object-Oriented Programming: Overview of software engineering, Introduction toObject-Oriented Programming (OOP) concepts (classes, objects, inheritance, polymorphism), Unified Modelling Language (UML)basics, Introduction to software development process and software development lifecycle (SDLC)

UNIT-II

Requirements Analysis and Design: Requirements analysis and specification, Use cases and scenarios, Object-oriented analysis and design(OOAD), Designpatterns, UML modelling techniques (class diagrams, sequence diagrams, state machine diagrams, activity diagrams)

UNIT-III

Software Construction and Testing: Software construction basics, Object-oriented design principles, Object-oriented programming languages (Java, C++, Python), Software testing basics (unit testing, integration testing, system testing), Test-driven development (TDD)

UNIT-IV

Software Maintenance and Evolution: Software maintenance basics, refactoring techniquesSoftwareversioncontrol,Codereviewandinspection,Softwareevolution and reengineering

UNIT-V

Advanced Topics in Object-Oriented Software Engineering: Model-driven engineering (MDE), Aspect-oriented programming(AOP), Component-based software engineering (CBSE),Service oriented architecture(SOA), Agile software development and Scrum methodologies.

REFERENCES TEXT BOOK(S):

1. An Introduction to Object Oriented Analysis and Design and the UnifiedProcess, 3rdEdition, Craig Larman, Prentice-Hall.
2. Programming in Java by Sachin Malhotra ,Oxford University Press

REFERENCE BOOKS

1. Requirements engineering: processes and techniques, G.Kotonya and, I.Sommerville,1998, Wiley
2. Design Patterns, E.Gamma, R.Helm, R.Johnson,andJ.Vlissides
3. The Unified Modeling Language Reference Manual, J.Rumbaugh, I.Jacobson and G.Booch, Addison Wesley

SUGGESTED CO-CURRICULAR ACTIVITIES:

1. Assign students real-world software development projects that require them to apply software engineering principles and practices.
2. Encourage students to prepare and deliver technical presentations or demonstrations on software engineering topics of their choice.
3. Invite industry professionals and experienced software engineers to deliver guest lectures or conduct workshops

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS III
B.Sc. – IT Semester – V (W.E.F. 2025-26)

SOFTWAREENGINEERING
PRACTICAL

1. To perform the Requirement analysis of the specified problem and draw a flowchart
2. Understanding of System modeling: Data model i.e.ER–Diagram and draw The ER Diagram with generalization, specialization and aggregation of specified problem statement
3. Understanding of System modeling: Functional modeling:DFDlevel0i.e.Context Diagram and draw it
4. Understanding of System modeling: Functional modeling: DFDlevel1 and DFD level2 and drawit.
5. Understanding different actors and usecases indetail of the specified problem statement and draw it Using Rational Rose software any other available software.
6. To perform the user's view analysis: Use case diagram and draw it using Rational Rose or any other available software.
7. To draw the structural view diagram: Class diagram of specified problemstatement using RationalRose or any other available software.
8. To draw the behavioral view diagram:State-chart diagram, Activity diagram of specified problem Statement using Rational Rose any other available software.
9. To understand testing and perform Boundary value analysis and Equivalence class testing.
10. To draw Flowgraph,DDpaths, calculation of cyclomatic complexity and find out all the Independent paths from the D D paths graph.
11. Casestudy: Prepares R S for a given problem statement

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

DEPARTMENT OF COMPUTER APPLICATIONS

MODEL BLUEPRINT(W.E.F.2025-26)

III B.Sc- (IT) SEMESTER-V

SUBJECT:SOFTWARE ENGINEERING Max.Marks:50

Model blue print for the model paper and choice

S.NO	TypeofQuestion	To be given in the Question Paper			Tobe answered		
		No. of Questions	Marks allotted toeach question	Total Marks	No. of Questions	Marks allotted toeach question	Total Marks
1	Section-I Essay Questions	6	10	60	3	10	30
2	Section-II ShortQuestions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		50

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

Model Blue print for the question paper Setter

ChapterName	EssayQuestions 10 Marks	ShortQuestions 5 Marks	Marksallotted tothe chapter
UNIT-I	2	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
TotalNo.of questions	6	7	
Total Marks Includingchoice			95

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

MODELPAPER(W.E.F.2025-26)

III B.Sc - IT Semester – V
SUBJECT:SOFTWARE ENGINEERING

Time:2 Hrs. **SEMESTER- V** **Max.Marks:50**

SECTION-I

Answer Any Three Questions. Atleast One question from each part (3x10=30)

Part-A

1. Explain the about Software Development Life Cycle (SDLC) phases ?
2. Explain bout the Software Requirements Analysis?
3. Demonstrate on the Object Oriented Programming Languages in OOSE?[

PART-B

4. Define UML? Categorize various types of UML in OOSE.
5. Define Software Version? What is software version control? Explain
6. Define MDE? Explain the various characteristics of MDE

SECTION-II

Answer any FOUR Questions. Each question carries 5marks (4x5=20)

7. Explain the terms Inheritance & Polymorphism in OOP?.
8. Demonstrate on Software development Process? [
9. Define Design pattern? List out various types of Design pattern
10. Discuss about Use case diagram? and Explain giving an example?
11. Write about any two Software Testing's?.
12. Define Code Inspection?And Explainit.
13. Write about Service Oriented Architecture(SOA).

P R GOVERNMENT (AUTONOMOUS) COLLEGE, KAKINADA
QUESTION BANK (W.E.F. 2025-2026)
COMPUTER APPLICATIONS
OBJECT ORIENTED SOFTWARE ENGINEERING
SEMESTER-V

Module I

Essay Questions: (10M)

1. What is Object Oriented Programming? Explain the important Principles? [BT1,2]
2. Explain the about Software Development Life Cycle (SDLC) phases ? [BT1]
3. Define UML? Categorize various types of UML in OOSE. [BT1,2]

Short Questions: (5M)

4. Explain the terms Inheritance & Polymorphism in OOP? [BT1,2]
5. Demonstrate on Software development Process? [BT1,2]
6. What are the various diagrams used in UML? [BT1,2]

Module II

Essay Questions: (10M)

1. Explain bout the Software Requirements Analysis? [BT1,2]
2. Demonstrate on the OOA and OOD? [BT1,2]
3. Demonstrate on the various UML modeling techniques ?

Short Questions: (5M)

4. Define Design pattern? List out various types of Design pattern[BT1,2]
5. Discuss about Use case diagram? and Explain giving an example?[BT1]
6. Explain about UML Activity diagram &What are the symbols used in an activity diagram?

Module III

Essay Questions: (10M)

1. Demonstrate on the Object Oriented Programming Languages in OOSE?[BT1,2]
2. Define Software Testing? Explain the various types of SoftwareTesting's ?[BT1,3]

Short Questions: (5M)

3. Write about Software Construction fundamentals?[BT1,2]
4. Write about any two Software Testing's? [BT1,2]
5. Explain about Test-Driven Development (TDD)?[BT1]

Module IV

Essay Questions: (10M)

1. Demonstrate on the various activities in Software Maintenance.[BT1]
2. Define Refactoring? What are the techniques used for it [BT1,2]
3. Define Software Version? What is software version control? Explain [BT1,2]

Short Questions: (5M)

4. Define Code Inspection?And Explainit.[BT1,2]
5. Define Software Evaluation?AndExplainit .[BT1,2]
6. What are Software reengineering activities?[BT1,2]

Module V

Essay Questions: (10M)

1. Define MDE? Explain the various characteristics of MDE.[BT1,2]
2. Define CBSE ?Explain its framework activities ?[BT1,2]
3. Explain about various phases of Agile Software Development.

Short Questions: (5M)

4. Write about Service Oriented Architecture(SOA) [BT1,2]
5. Demonstrate on Aspect Oriented Programming(AOP) and its importance?[BT2]
6. Define SCRUM? Demonstrate on SCRUM Methodologies and Principles

Mapping of Cos with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
Course Code Major 14	**Computer Networks**	**III B.Sc.(IT) SEM - V Major 14 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites	BasicComputerKnowledge	3	-	1	4

CourseObjective

1. Understand the basics of Data Communication
2. Understand the OSI layer .
3. Understand different protocols.

Course Outcomes

On completion of the course, the students will be able to-

Outcome	Description	CognitiveLevel
CO1	Understand and apply network applications, hardware, software, and reference models for network communication.	Knowledge
CO2	Design and analyze data link layer protocols, multiple access protocols, and wireless LAN technologies.	Knowledge
CO3	Design routing algorithms, congestion control algorithms, and evaluate network layer protocols for internetworking.	Analysisand Evaluation
CO4	Analyze transport service, transport protocols, and evaluate UDP and TCP in the internet.	Application
CO5	Understand and evaluate application layer protocols, including DNS, email, WWW, and network Management protocols.	Creativity

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
III B.Sc.–IT Semester–V(W.E.F.2025-26)

Computer Networks

SYLLABUS

UNIT-I

INTRODUCTION: Network applications, network hardware, network software, reference models :OSI, TCP/IP, Internet, Connection oriented network X.25, frame relay.

THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks , mobile telephone system.

UNIT-II

DATA LINK LAYER: Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example datalink protocols -HDLC, the datalink layer on the internet.

MEDIUM ACCESSSUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wireless LAN, Broadband Wireless, Bluetooth.

UNIT-III

NETWORKLAYER: Network layer design issues, routing algorithms, Congestion control algorithms, Internet working, the network layer in the internet(IPv4andIPv6),Quality of Service.

UNIT-IV

TRANSPORTLAYER: Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP.

UNIT-V

APPLICATIONLAYER: Domain name system, electronic mail, WorldWideWeb: architectural overview, dynamic web document and http.

APPLICATION LAYER PROTOCOLS:Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.

REFERENCES TEXTBOOKS

1. A.S.Tanenbaum(2003),ComputerNetworks,4th edition,PearsonEducation/PHI,NewDelhi,India

REFERENCEBOOKS

1. BehrouzA.Forouzan(2006),DatacommunicationandNetworking,4thEdition,McGraw Hill,India.
2. Kurose,Ross(2010),ComputerNetworking:Atopdownapproach,PearsonEducation,India.

SUGGESTEDCO-CURRICULARACTIVITIES:

1. Hands-onexercisestoconfigurenetworkapplications
2. GuestLecturesandWorkshopsonroutingalgorithms,congestioncontrol,andnetworklayer protocols
3. GroupProjectsonNetworkApplicationDevelopment

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS III
B.Sc. – IT Semester – V (W.E.F. 2025-26)

Computer Networks
PRACTICAL

1. Introduction to networking tools and Linux
2. Introduction to Packet Tracer tool from Cisco
3. Study different types of network cables
4. Study different types of networks in detail
5. Study the basics of TCP/IP using various networking tools available in Linux
6. Create a network topology using packet tracer
7. Configure routing using packet tracer
8. Study network security algorithms
9. Implements DNS using packet tracer
10. Implement SMTP connectivity

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

DEPARTMENT OF COMPUTER APPLICATIONS

(W.E.F.2025-26) III B.Sc- (IT) SEMESTER-V

SUBJECT: Computer Networks **Max.Marks:50**

Model blue print for the model paper and choice

S.NO	TypeofQuestion	TobegivenintheQuestion Paper			Tobe answered		
		No. of Questions	Marks allotted toeach question	Total Marks	No. of Questions	Marks allotted toeach question	Total Marks
1	Section-I Essay Questions	6	10	60	3	10	30
2	Section-II ShortQuestions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		50

$$\text{Percentageofchoicegiven} = \frac{95-50}{95} \times 100 = \frac{45}{95} \times 100 = 47.36\%$$

ModelBlueprintforthequestionpaper Setter

ChapterName	EssayQuestions 10 Marks	ShortQuestions 5 Marks	Marksallotted tothe chapter
UNIT-I	2	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
TotalNo.of questions	6	7	
TotalMarksIncludingchoice			95

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS

MODEL PAPER(W.E.F.2025-26)

III B.Sc - IT Semester – V

COMPUTER NETWORKS

Time:2 Hrs. **SEMESTER- V** **Max.Marks:50**

SECTION-I

Answer Any Three Questions. At least One question from each part (3x10=30)

Part-A

1. Explain the OSI reference model in detail
2. Explain about Network Devices with examples
3. Explain about Datalink layer and its design issues

Part-B

4. Discuss about Congestion Control techniques in Network layer
5. Write about Transport layer and its services
6. Briefly discuss about FTP & SMTP

SECTION-II

AnsweranyFOURQuestions.Eachquestioncarries5marks (4x5=20)

7. Write about Guided media with example
8. Explain about X.25 frame relay
9. What is Sliding window Protocol
10. Explain about Ethernet
11. What is IPv4 & IPV6
12. Write a short note on Simple transport Protocol (STP)
13. What is TELNET

Question Bank

Essay Questions

1	Explain the OSI reference model in detail	**BT2**	**CO1**	**PO1**
2.	Explain the TCP/IP reference model in detail	BT3	CO4	PO2
3.	Explain about Network Devices with examples	BT1	CO4	PO3

1.	Explain about Data link layer and its design issues	BT2	CO2	PO5
2.	Write about HDLC protocol in detail	BT2	CO1	PO1
3.	Write about error detection and correction in data link layer?	BT3	CO4	PO2

1.	Explain about design issues of Network layer	BT3	CO4	PO1
2.	Discuss about Congestion Control techniques in Network layer	BT2	CO4	PO2
3.	Describe the role of (IPV4 & IPV6)? Highlight the differences?	BT1	CO2	PO1

1.	Write about Transport layer and its services	BT1	CO1	PO1
2.	Differentiate UDP & TCP in Transport layer	BT2	CO1	PO1

1.	Discus about DNS? Explain its working in networking	BT2	CO3	PO2
2.	Briefly discuss about FTP & SMTP	BT4	CO2	PO4

Shorts Questions

1.	Explain about X.25 frame relay	BT2	CO4	PO2
2.	Write about Guided media with example	BT1	CO2	PO1
3.	Write about Wireless transmission media	BT2	CO1	PO1

1.	What is Sliding window Protocol	BT2	CO1	PO1

2.	Explain Briefly about Bluetooth	BT3	CO4	PO2
3.	Explain about Ethernet	BT1	CO4	PO3

1.	What is IPv4 & IPV6	BT2	CO3	PO2
2.	What is Network layer	BT4	CO2	PO4
3.	Define Routing? List different routing algorithms	BT2	CO1	PO1

1.	Write a short note on Simple transport Protocol (STP)	BT2	CO1	PO1
2.	What is UDP?	BT2	CO1	PO1

1.	Write about WWW	BT1	CO1	PO1
2.	What is TELNET	BT2	CO1	PO1

Mapping of Cos with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P O 1 0	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															

PRGOVERNMENTCOLLEGE(AUTONOMOUS),KAKINADA					
Course Code	**Mobile Application Development**	**III B.Sc.(IT) Major 15 Sem -V 2025-26**			
Hours	90 (60+ 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

Course Objective

1. Understand the importance of Mobile Application Development
2. Understand the Android studio and Flutter.
3. Apply programming skills to develop Mobile applications.

Course Outcomes

On completion of the course, the students will be able to		
Outcome	**Description**	**Cognitive Level**
CO1	Lean-to setup an ew Material Appusing Android Studio.	Knowledge
CO2	Understand the Widget tree and learn trouser-made Flutter, widgets for user interface design.	Knowledge
CO3	Learn to incorporate Image and Text Widgets to create simple user interfaces.	Analysis and Evaluation
CO4	Learn to customize pre-built Flutter widgets.	Application
CO5	Adding App Icons for iOS and Android builds.	Creativity

P.R.GOVT.COLLEGE(AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS

III B.Sc.–IT Semester–V(W.E.F.2025-26)

Mobile Application Development

SYLLABUS

UNIT:I

Introduction: Frame works and Tools for Mobile App Development, Characteristics of Mobile Applications, History of Mobile Application Frameworks and Tools, Introduction to Android, iOS,andFlutter. Client-ServerArchitecture:1-tier,2-tier,3-tier, types of Connection, Synchronization, Mobile Device Types, Mobile Device Components, Types of Mobile Applications.

UNIT:II

Mobile Application Development using Flutter: to set up a new Material App using Android Studio, Creating UI with Flutter: Using Hot Reload and Hot Restart to quickly refresh the app UI and understand when to use each, using the Pub spec. yaml file to incorporate, dependencies, custom assets and fonts, an introduction to the Widget build() method, using layout widgets such as Columns, Rows, Containers and Cards, incorporating Material icons using the Icons class.

UNIT:III

Building Apps with State: Understanding the difference between Stateful and Stateless widgets and when they should each be used, understanding how callbacks can be used to detect user interaction in button widgets, declarative style of UI programming and how Flutter widgets react to state changes, importing dart libraries to incorporate additional functionality, variables, data types and functions work in Dart, building flexible layouts using the Flutter Expanded widget, relationship between setState(), State objects and Stateful Widgets.

UNIT:IV

Using the Dart package manager: to use Dart package manager to incorporate Flutter compatible packages into your projects, functions in Dart and the arrow syntax, to refactor widgets andunderstand Flutter's philosophy of UI as code. Structuring Flutter Apps: to use Dart Constructors to create customisable Flutter widgets, apply common mobile design patterns to structure Flutter apps.

UNIT:V

Security: User to Mobile Client Security Issues, Mobile Client Security Issues, Client-Server Communications Security Issues, Existing Web Architectures and Back-End Systems Security Issues, Mobile Application Development Management

REFERENCES

1. Lee,H.Schneider,andR.Schell:MobileApplications:Architecture,Design,andDevelopment.Pearson
2. MarcoL.Napoli:BeginningFlutter:AHandsonGuidetoAppDevelopment.Wiley
3. Bill Phillips &Brian Hardy: Android Programming the Big Nerd Ranch Guide Big Nerd Ranch
4. Brian Fling :Mobile Design and Development. O'Reilly

P.R.GOVT.COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS III
B.Sc. – IT Semester – V (W.E.F. 2025-26)

Mobile Application Development

PRACTICAL

1. Develop a program to implement frame layout, table layout and relative layout.

2. Develop a program to implement Text View and Edit Text.

3. Develop a program to implement Auto Complete Text View.

4. Develop a program to implement Button. Image Button and Toggle Button.

5. Develop a program to implement login window using the above Ul controls.

6. Develop a program to implement Checkbox

7. Develop a program to implement Radio Button and Radio Group.

8. Develop a program to implement Progress Bar.

9. Develop a program to implement List View, Grid View, Image View and Scroll View.

10. Develop a program to implement Date and Time Picker

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Mobile application Project Ideas

i) Tic Tac Toe Game

P.R.GOVT.COLLEGE (AUTONOMOUS),KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
MODEL BLUE PRINT(W.E.F.2025-26)
III B.Sc- (IT) SEMESTER-V

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-I Essay Questions	6	10	60	3	10	30
2	Section-II Short Questions	7	5	35	4	5	20
TOTAL		13		95	TOTALMARKS		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	2	30
UNIT-II	1	2	20
UNIT-III	1	1	15
UNIT-IV	1	1	15
UNIT-V	1	1	15
Total No.of questions	6	7	
Total Marks Including choice			95

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
III B.Sc (IT) SEMESTER-V

Course 15: Mobile Application Development

Time:2 ½ Hrs **Max. Marks: 50**

SECTION –I

Answer any three of the following questions. Must attempt atl east one question from each part.
Each question carries 10 Marks. 3 X 10 = 30M

Part-A

1. Explain the evolution and history of mobile application frameworks and tools. Explain History of Mobile Application Framework and Tools?
2. Explain the evolution and history of mobile application frameworks and tools.
3. Write About Flutter Tool and explain Hot Reload and Hot Restart.

Part-B

4. Explain how Flutter widgets respond to state changes in declarative UI programming.
5. How do you use the Dart package manager to include packages in a Flutter project?
6. Describe the best practices in mobile application development management.

SECTION - II

Answer any four of the following questions. Each question carries 5 marks. 4 X 5 = 20M

7. Define 1-tier, 2-tier, and 3-tier architecture.
8. What are the main characteristics of mobile applications?
9. What is the purpose of the pubspec.yaml file in Flutter?
10. Mention any two layout widgets in Flutter.
11. What is the purpose of the setState() method in Flutter?
12. Mention one advantage of using Dart constructors in custom widgets.
13. What are mobile client security concerns?

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

III B.Sc (IT) (W.E.F 2025-2026)

SEMESTER – III

QUESTION BANK

Subject: Mobile Application Development **Paper: 15**

Essay Questions

Unit-1

1.	Explain the types of connections and synchronization used in mobile applications.	BT1	CO1	PO1
2.	Explain the evolution and history of mobile application frameworks and tools.	BT2	CO2	PO2
3.	Describe about Frame work and Tools For Mobile App Development?	BT2	CO3	PO3

Unit-2

1.	Write About Flutter Tool and explain Hot Reload and Hot Restart.	BT1	CO1	PO1
2.	Discuss how Material icons are incorporated into Flutter applications	BT2	CO2	PO2
3.	Explain the build() method and how layout widgets like Columns, Rows, Containers, and Cards are used.	BT2	CO3	PO3

Unit-3

1.	Explain how Flutter widgets respond to state changes in declarative UI programming.	BT1	CO1	PO1
2.	Explain the relationship between setState(), State objects, and Stateful widgets with an example.	BT2	CO2	PO2
3.	Discuss the use of Dart libraries, variables, and functions in Flutter apps.	BT2	CO3	PO3

Unit-4

1.	How do you use the Dart package manager to include packages in a Flutter project?	BT1	CO1	PO1
2.	Describe how to use Dart constructors to create customizable widgets.	BT2	CO2	PO2

Unit-5

1.	Discuss user-to-mobile client, mobile client, and client-server communication security issues.	BT1	CO1	PO1
2.	Explain the existing web architecture and backend system security issues in mobile development.	BT2	CO2	PO2

Short Questions:

Unit-1

1.	Define 1-tier, 2-tier, and 3-tier architecture.	BT1	CO1	PO1
2.	What are the main characteristics of mobile applications?	BT2	CO2	PO2
3.	Name the components of a mobile device.	BT2	CO3	PO3

Unit-2

1.	What is the purpose of the pubspec.yaml file in Flutter?	BT1	CO1	PO1
2.	Mention any two layout widgets in Flutter.	BT2	CO2	PO2
3.	How do you use the Icons class in Flutter?	BT2	CO3	PO3

Unit-3

1.	Differentiate between Stateful and Stateless widgets.	BT1	CO1	PO1
2.	What is the purpose of the setState() method in Flutter?	BT2	CO2	PO2
3.	List basic data types used in Dart.	BT2	CO3	PO3

Unit-4

1.	What is the Dart package manager?	BT1	CO1	PO1
2.	What does "UI as code" mean in Flutter?	BT1	CO1	PO1
3.	Mention one advantage of using Dart constructors in custom widgets.	BT2	CO2	PO2

Unit-5

1.	List any two user-to-mobile client security issues.	BT1	CO1	PO1
2.	Define client-server communication security in mobile apps.	BT2	CO2	PO2
3.	What are mobile client security concerns?	BT2	CO2	PO2

Mapping of Cos with POs/PSOs

CO /PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P O 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1															
CO 2															
CO 3															
CO 4															
CO 5															