PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
Course Code	**Essentials and applications of mathematical, physical and chemical sciences**	**I B. Sc-(IT)** **Sem - I** **2024-25**			
Hours	60	L	T	P	C
Pre requisites	Basic Computer Knowledge	4	-	-	4

Course Objective
1.The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. 2.The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations. .

Course Outcomes	
On Completion of the course, the students will be able to –	
CO1	Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
CO2	To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.
CO3	To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.
CO4	Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical
CO5	To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

UNIT I: ESSENTIALS OF MATHEMATICS

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus- Amplitude form and conversions
Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles Vectors: Definition of vector addition – Cartesian form – Scalar and vector product and problems Statistical Measures: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis
Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.
Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.
Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd. 4.Basic Statistics by B.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.

8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

Activities:

 UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

1. Identifying the attributes of network (Topology, service provider, IP address and bandwidth of
2. your college network) and prepare a report covering network architecture.
3. Identify the types of malwares and required firewalls to provide security.
4. Latest Fraud techniques used by hackers

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P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

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

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

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

PAPER- II **Marks: 50M**

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
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

MODEL PAPER

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

SECTION-I

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

Part-A

1. Long Answer Question1.
2. Long Answer Question2.
3. Long Answer Question3.

Part-B

4. Long Answer Question4.
5. Long Answer Question5.
6. Long Answer Question6.

SECTION-II

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

7. Short answer question1.
8. Short answer question2.
9. Short answer question3.
10. Short answer question4.
11. Short answer question5.
12. Short answer question6.
13. Short answer question7.

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	**ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES**	**I B.Sc-(IT) Sem - I 2024-25**			
Hours	60	L	T	P	C
Pre requisites	Basic Computer Knowledge	4	-	-	4

Course Objective
1 The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. 2.The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Course Outcomes	
On Completion of the course, the students will be able to –	
CO1	Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems..
CO2	To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations..
CO3	Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.
CO4	Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.
CO5	Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics. Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

SYLLABUS

UNIT I: ADVANCES IN BASICS MATHEMATICS

Straight Lines: Different forms – Reduction of general equation into various forms –Point of intersection of two straight lines
Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule
Integration: Integration as a reverse process of differentiation – Basic methods of integration
Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose of a matrix and determinants

UNIT II: ADVANCES IN PHYSICS

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Mathematical Modelling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids, Application of nanotechnology: Nanomedicine, Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,
Application of medical physics: Radiation Therapy, Nuclear medicine
Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: ADVANCED APPLICATIONS OF COMPUTER SCIENCE

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah

11. Environmental Chemistry by Anil.K.D.E.
12. Digital Logic Design by Morris Mano
13. Data Communication & Networking by Bahrouz Forouzan.

Activities:

UNIT V: Advanced Applications of computer Science

1. Students must be able to convert numbers from other number system to binary number systems
2. Identify the networking media used for your college network
3. Identify all the networking devices used in your college premises.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES
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-I Essay Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-II Short Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

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

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

PAPER- I **Marks: 50M**

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
Programme: B.Sc – Information Technology (Major)
I B.Sc-(IT) Semester- I w.e.f (2024-25)

ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES
MODEL PAPER

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

SECTION-I

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

Part-A

1. Long Answer Question1.
2. Long Answer Question2.
3. Long Answer Question3.

Part-B

4. Long Answer Question4.
5. Long Answer Question5.
6. Long Answer Question6.

SECTION-II

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

7. Short answer question1.
8. Short answer question2.
9. Short answer question3.
10. Short answer question4.
11. Short answer question5.
12. Short answer question6.
13. Short answer question7.

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	**PROBLEM SOLVING IN C**	**I B.Sc- (IT) Sem - II 2024-25**			
Hours	90 (60 Theory + 30 Practical)	L	T	P	C
Pre requisites	Basic Computer Knowledge	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
DEPARTMENT OF COMPUTER APPLICATIONS
I B.Sc (IT) Semester- II (2023-24)
PROBLEM SOLVING IN C
SYLLABUS.

UNIT I

Introduction to Computer and Programming: Introduction - Block diagram of a computer - Hardware and Software -Generations of Programming Languages – Algorithms - Flowcharts. Introduction to C: Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords –Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C - Operators in C.

UNIT II

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

UNIT III

Arrays: Introduction – One Dimensional Arrays - Declaration, Initialization and Memory representation; Two Dimensional Arrays - Declaration, Initialization and Memory Representation; Strings: Declaring and Initializing string variables, character and string handling functions.

UNIT IV

Functions: Introduction – Function declaration/ prototype – Function definition – function call – return statement – Categories of functions - Recursion - Parameter Passing techniques - Scope of variables – Storage Classes.

Pointers: Introduction to Pointers – declaring and initializing pointer Variables – accessing values using pointers - Pointer Arithmetic – Dynamic Memory Allocation.

UNIT V

Structures and Unions: Introduction – Structure definition - accessing structure members – Array of Structures - union definition – difference between structures and unions.

Files: Introduction to Files – Using Files in C – Reading Data from Files – Writing Data to Files – Detecting the End-of-file – Accepting Command Line Arguments.

TEXT BOOKS:

1. E Balagurusamy – Programming in ANSI C – Tata McGraw-Hill publications.
2. Computer fundamentals and programming in C, REEMA THAREJA, OXFORD UNIVERSITY PRESS

REFERENCE BOOKS:

1. Brain W Kernighan and Dennis M Ritchie - The ‘C’ Programming language - Pearson Publications.
2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications.

YashavantKanetkar - Let Us ‘C’ – BPB Publications.

Online Resources:

https://www.tutorialspoint.com/cprogramming/index.html

https://www.learn-c.org/

https://www.programiz.com/c-programming

https://www.w3schools.in/c-tutorial/

https://www.cprogramming.com/tutorial/c-tutorial.html

https://www.tutorialspoint.com/cplusplus/index.html

https://www.programiz.com/cpp-programminghttp://www.cplusplus.com/doc/tutorial/

https://www.learn-cpp.org/

https://www.javatpoint.com/cpp-tutorial

SUGGESTED CO-CURRICULAR ACTIVITIES:

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

a. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

b. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

PROBLEM SOLVING IN C – PRACTICAL

1. Write a program to find the area of circle and triangle.
2. Write a program to find simple and compound interest.
3. Write a program to convert temperature from Celsius to Fahrenheit
4. Write a program to find whether a number is even or odd
5. Write a program to find sum and average of 5 numbers
6. Write a program to check whether the given number is Armstrong or not.
7. Write a program to find the sum of individual digits of a positive integer.
8. Write a program to generate the first n terms of the Fibonacci sequence.
9. Write a program to find both the largest and smallest number in a list of integer values
10. Write a program to calculate factorial of given integer value using recursive functions
11. Write a program for addition of two matrices.
12. Write a program for multiplication of two matrices.
13. Write a program to perform various string operations.
14. Write a program to search an element in a given list of values.
15. Write a C program to write and read data into/from a File.

RECOMMENDED CO-CURRICULAR ACTIVITIES:
MEASURABLE

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity)
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams)

4. Field studies (individual observations and recordings as per syllabus content and related areas (Individual or team activity)
5. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

General Group Discussion
Visit to Software Technology parks / industries

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

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

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
I B.Sc (IT) Semester- III (2024-25)
PROBLEM SOLVING IN C

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

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

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
I B.Sc (IT) Semester- II (2024-25)
PROBLEM SOLVING IN C

Marks: 50M

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
I B.Sc (IT) Semester- II (2024-25)
PROBLEM SOLVING IN C

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

14. Define Computer? Explain Block diagram of a computer?
15. Explain various operators in C with example.
16. Explain various Looping Statements in C with example.

Part-B

17. Write about Two Dimensional Array?
18. What is Function ? Explain about Function call?
19. Write difference between structures and unions?

SECTION-II

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

20. Write about features of C language.
21. Explain various data types in C.
22. Write about one dimensional array with example.
23. Write about break and continue statements with examples.
24. What is recursion? What advantage is there in its use?
25. Write about switch statements.
26. Explain about Dynamic Memory Allocation.

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	**MATHEMATICS FOR COMPUTER SCIENCE**	**I B.Sc- (IT) Sem - II 2024-25**			
Hours	90 (60 Theory + 30 Practical)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

Course Objective
The objective of this course is to provide students 1.To apply mathematical logic to solve the problems 2.To understand sets, relations, functions, groups and discrete structures 3.To apply combinations and permutations to real world applications 4.To solve real world problems using graphs & trees

Course Outcomes	
Students after successful completion of the course will be able to:	
CO1	1. Apply mathematical logic to solve problem
CO2	2. Understand sets, relations, functions, and discrete structures as sets, relations, and functions.
CO3	3. Use logical notation to define and reason about fundamental mathematical concepts such
CO4	4. Formulate problems and solve recurrence relations.
CO5	5. Model and solve real-world problems using graphs and trees

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
I B.Sc (IT) Semester- II (2024-25)
MATHEMATICS FOR COMPUTER SCIENCE
SYLLABUS.

UNIT I

Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT II

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions. Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra.

UNIT III

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion- Exclusion.

UNIT IV

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relations by substitution and Generating functions, the method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT V

Graphs: Basic Concepts, Isomorphisms and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

REFERENCES: TEXT BOOK (S)

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. (UNITS - I, II)
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed. (Units - III, IV, V)
3. Discrete Mathematics by R.K. Bisht and H.S.Dhami, Oxford University Press

REFERENCE BOOKS

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill education (India) Private Limited.
2. Discrete Mathematics, D.S. Malik & M.K. Sen, Revised edition Cengage Learning.
3. Elements of Discrete Mathematics, C. L. Liu and D. P. Mohapatra, 4th edition, McGraw Hill education (India) Private Limited.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.

5. Discrete and Combinatorial Mathematics, R. P. Grimaldi, Pearson.

SUGGESTED CO-CURRICULAR ACTIVITIES:

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

MATHEMATICS FOR COMPUTER SCIENCE – PRACTICAL

1. Programming illustration of various propositional logic operations
2. Programming illustration of sets and their operations
3. Implementation of Graphs
4. Illustration of Graph operations including BFS and DFS
5. Implementation of Binary Trees
6. Implementation of various operations on Binary Trees
7. Implementation of Spanning Tree algorithms
8. Illustration of Euler circuits and Hamiltonian circuits
9. Illustration of chromatic number and its applications
10. Illustration of algebraic structure

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
I B.Sc (IT) Semester- III (2024-25)
MATHEMATICS FOR COMPUTER SCIENCE

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

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

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
I B.Sc (IT) Semester- II (2024-25)
MATHEMATICS FOR COMPUTER SCIENCE

Marks: 50M

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
I B.Sc (IT) Semester- II (2024-25)
MATHEMATICS FOR COMPUTER SCIENCE

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. Long Answer Question1.
2. Long Answer Question2.
3. Long Answer Question3.

Part-B

4. Long Answer Question1.
5. Long Answer Question2.
6. Long Answer Question3.

SECTION-II

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

7. Short answer question1.
8. Short answer question2.
9. Short answer question3.
10. Short answer question4.
11. Short answer question5.
12. Short answer question6.
13. Short answer question7.

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	**DATABASE MANAGEMENT SYSTEM**	**II B.Sc- (IT) Sem - III 2024-25**			
Hours	90 (60 Theory + 30 Practical)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

Course Objective
1. Understand the role of a database management system in an organization. *2.* Understand basic database 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.

Course Outcomes	
On Completion of the course, the students will be able to –	
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. Perform PL/SQL programming using concept of Cursor Management, Error Handling, Packages.
CO3	Students would learn about Apply various Normalization techniques Model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model .
CO4	Students would learn about Design and implement a small database project.

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- III (2024-25)
DATABASE 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.

III. REFERENCES:

TEXT BOOKS:

1. Database management Systems, Alexis Leon and Mathews Leon, Vikas Publications 2002
2. Peter Rob, Carlos Coronel, Database Systems Design, Implementation and Management, Seventh Edition, Thomson (2007)
3. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB publications

REFERENCE BOOKS:

1. Elimasri / Navathe, Fundamentals of Database Systems, Fifth Edition, Pearson Addison Wesley (2007).
2. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed., ELSEVIER.

3. SQL: The Ultimate Beginners Guide by Steve Tale.
4. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
5. Database Management Systems by Raghu Ramakrishnan, McGrawhill

IV. SUGGESTED CO-CURRICULAR ACTIVITIES:

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

PRACTICALS

1. Illustrate the creation of a table with constraints

2. Creation of college database and establish relationships between tables

3. Employee database
An enterprise wishes to maintain a database to automate its operations. Enterprise divided into certain departments and each department consists of employees. The following two tables describes the automation schemas.
Dept (deptno, dname, loc)
Emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)
Generate the following queries using data of above tables.
i. List out all employees details
ii. Display empno, ename, job and sal columns of all employees
iii. Display employee details who are working as „CLERK"
iv. Find out number of employees working in each department
v. Find out job wise total salaries and number of employees.
vi. Calculate HRA as 30% and DA as 65% of salary

4. Demonstrate the use of GRANT and REVOKE commands to provide authorization
PL/SQL PROGRAMS

5. Write a PL/SQL program to check the given number is Armstrong or not.

6. Write a PL/SQL program to check the given string is palindrome or not.

7. Writ a PL/SQL program to generate multiplication tables

8. Write a PL/SQL code to find the factorial of any number.

9. Write a PL/SQL program to check the given number is palindrome or not.

10. Write a PL/SQL program to display to 10 rows in Emp table based on their job and salary.

11. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people. Write a procedure to update the salary of Employee, who are not getting commission by 10%

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- III (2024-25)
DATABASE MANAGEMENT SYSTEM

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

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

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- III (2024-25)
DATABASE MANAGEMENT SYSTEM

Marks: 50M

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

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 GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- III (2024-25)
DATABASE MANAGEMENT SYSTEM

MODEL PAPER

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 5 marks (4x5=20M)

1.

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 data types in SQL (BT1)
12. Explain about Aggregate functions in SQL (BT1)
13. Write about cursors in PL/SQL (BT2)

PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	PYTHON PROGRAMMING	**II B.Sc (IT) Sem - III 2024-25**			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

Course Objective
1. Understand the basics of Data Science
2. Understand the syntax of Python programming language.
3. Apply python programming skills to solve problems.

Course Outcomes

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

Outcome	**Description**	**Cognitive Level**
CO1	Understand basic concepts of Programming	Knowledge
CO2	Understand why python is a useful scripting language for developers.	Knowledge
CO3	Use standard 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

DEPARTMENT OF COMPUTER APPLICATIONS

II B. Sc – IT Semester – III (W.E.F. 2024-25)

PYTHON PROGRAMMING

SYLLABUS

UNIT I

Introduction to Python: Features of Python Language, installing Python, Environment Setup, python syntax, running a python script, Python 2.x Vs Python 3.x, Python Programming basics: 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

Standard I/O Operations, python casting Control statements- Conditional branching: if-else, nested if, 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 perations

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).

UNIT V

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:

TEXT BOOKS:

l. "ReemaThareja", Python Programming using problem solving approach, First Edition, Oxford

higher Education.

REFERENCE BOOKS:

l . Kenneth A. Lambert, Fundamentals of Python

2. James Payne, Beginning Python using Python 2.6 and Python 3

3. Charles Dierach, Introduction to Computer Science using Python

IV. SUGGESTED CO-CURRICULAR ACTIVITIES:

1. Organize coding competitions where students can solve programming problems using Python

2. Encourage students to create Python-based projects and showcase them in a project exhibition.

3. Encourage students to contribute to open-source Python projects. This activity exposes them to real-world codebases, collaborative development practices, and the Python community.

PYTHON PROGRAMMING - PRACTICAL

1. Write a program to demonstrate different number data types 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 “Sun May 29 02:26:23 IST 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. Write a Python program to construct the following pattern, using a nested for loop

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

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. Write a Python program to define a module and import a specific function in that module to 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. 2023-24)
II B.SC- (IT) SEMESTER-III

SUBJECT: PYTHON PROGRAMMING **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			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 Short Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-II Essay Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

Percentage of choice given = $\frac{95 - 50}{95} \times 100 = \frac{45}{95} \times 100 = 45.95\%$

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

DEPARTMENT OF COMPUTER APPLICATIONS

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

II B. Sc-IT Semester -III

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

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

SECTION-I

Answer Any Three Questions. At least 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

Answer any FOUR Questions. Each question carries 5 marks (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
MODEL BLUEPRINT
II B.Sc-IT SEMESTER-III (W.E.F. 2024-25)

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

Model Blueprint 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

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					
	OPERATING SYSTEM	**II B.Sc (IT) Sem - III 2024-25**			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	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.

Course Learning Outcomes:
Upon successful completion of the course, a student will be able to:
1. Know Computer system resources and the role of operating system in resource management with algorithms
2. Understand Operating System Architectural design and its services.
3. Gain knowledge of various types of operating systems including Unix and Android.
4. Understand various process management concepts including scheduling, synchronization, and deadlocks.
5. Have a basic knowledge about multithreading.
6. Comprehend different approaches for memory management.
7. Understand and identify potential threats to operating systems and the
8. security features design to guard against them.

Syllabus

UNIT- I

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

UNIT- II

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

UNIT III

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

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

UNIT IV

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

UNIT V

File and I/O Management, OS security : Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization.

Additional topic:

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

REFERENCE BOOKS:

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

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
MODEL BLUE PRINT (W.E.F. 2024-25)

SUBJECT: OPERATING SYSTEM **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			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 Short Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-II Essay Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

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

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
MODEL BLUE PRINT
II B.SC-IT SEMESTER-III (W.E.F. *2024-25*)

SUBJECT: OPERATING SYSTEM **Time: 2 Hrs**

Marks: 50

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-I	2	2	30
UNIT -II	1	2	20
UNIT -III	1	1	15
UNIT -IV	2	2	30
Total No. of questions	6	7	
Total Marks Including choice			95

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc(IT)-SEMESTER-III
Paper-III: Operating Systems

Time:2 Hrs **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 is Operating system? Explain function of Operating System.[BT1]
2. Explain about Process Scheduling Algorithms in detail? [BT1]
3. Discuss about Deadlock 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 carries 5 marks. 4 X 5 = 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]

PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
Course Code	**COMPUTER ARCHITECTURE**	**I B.Sc- (IT)** **Sem - III** **2024-25**			
Hours	90 (60 Theory + 30 Practical)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

Course Objective
• To conceptualize the basics of organizational and architectural issues of a digital computer. • To analyze performance issues in processor and memory design of a digital computer. • To understand various data transfer techniques in digital computer. • To analyze processor performance improvement using instruction level parallelism

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(2024-25)
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. 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
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 (2024-25)
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-I Essay Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-II Short Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

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

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- III (2024-25)
COMPUTER ARCHITECTURE

Marks: 50M

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 (2024-25)
COMPUTER ARCHITECTURE

MODEL PAPER

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

SECTION-I

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

Part-A

1. Long Answer Question1.
2. Long Answer Question2.
3. Long Answer Question3.

Part-B

4. Long Answer Question1.
5. Long Answer Question2.
6. Long Answer Question3.

SECTION-II

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

7. Short answer question1.
8. Short answer question2.
9. Short answer question3.
10. Short answer question4.
11. Short answer question5.
12. Short answer question6.
13. Short answer question7.

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					
	WEB TECHNOLOGIES	**II B.Sc (IT)** **Sem - IV** **2024-25**			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	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. Understand Lists, Dictionaries and Regular expressions in Python.	Knowledge
CO3	3. Understanding how searching and sorting is performed in Python.	Analysis and Evaluation
CO4	4. Understanding how linear and non-linear data structures works.	Application
CO5	5. To learn the fundamentals of writing Python scripts.	Creativity

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.

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 Raj Kamal(TMH)
7. Internet and Web Basics by Ned Snell, Bob Temple, TM Clark(Pearson)

SUGGESTEDCO-CURRICULARACTIVITIES:

1. Buildawebsitewith10pagesforthecasestudyidentified.
2. Training of students by related industrial experts.
3. Assignments
4. Seminars, Group discussions ,Quiz, Debates etc.(on related topics).
5. Presentation by students on best websites

PRACTICAL

1. Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
2. Create your class timetable using table tag.
3. Create user Student feedback form (use textbox, text area, checkbox, radio button, select box etc.)
4. Write HTML code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
5. Create your resume using HTML tags also experiment with colors, text , link ,size and also other tags you studied.
6. Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS).
7. Use Inline CSS to format your resume that you created.
8. Use External CSS to format your class timetable as you created.
9. Use External, Internal, and Inline CSS to format college web page that you created.
10. Develop a JavaScript to display today's date.
11. Develop simple calculator for addition, subtraction, and multiplication and division operation using JavaScript
12. Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.
13. Create HTML Page that contains form with fields Name, Email, Mobile No, Gender, Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked

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

SUBJECT: WEB TECHNOLOGIES **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			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 Short Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-II Essay Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

Percentage of choice given = $\frac{95 - 50}{95} \times 100 = \frac{45}{95} \times 100 = 45.95\%$

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- IV (2024-25)
WEB TECHNOLOGIES

MODEL PAPER

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

SECTION-I

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

Part-A

1. Long Answer Question1.
2. Long Answer Question2.
3. Long Answer Question3.

Part-B

4. Long Answer Question1.
5. Long Answer Question2.
6. Long Answer Question3.

SECTION-II

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

7. Short answer question1.
8. Short answer question2.
9. Short answer question3.
10. Short answer question4.
11. Short answer question5.
12. Short answer question6.
13. Short answer question7.

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

DEPARTMENT OF COMPUTER APPLICATIONS
MODEL BLUEPRINT
II B.Sc-IT SEMESTER-IV (W.E.F. 2024-25)

SUBJECT: WEB TECHNOLOGIES **Time: 2 Hrs**
Marks: 50

Model Blueprint 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

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					
	OBJECT ORIENTATED PROGRAMMINGTHROUGH JAVA	**II B.Sc (IT)** **Sem - IV** **2024-25**			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	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. Understand Lists, Dictionaries and Regular expressions in Python.	Knowledge
CO3	3. Understanding how searching and sorting is performed in Python.	Analysis and Evaluation
CO4	4. Understanding how linear and non-linear data structures works.	Application
CO5	5. To learn the fundamentals of writing Python scripts.	Creativity

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. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao & Kogent Learning Solutions Inc.

2. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company

3. John R.Hubbard, Programming with Java, Second Edition, Schaum' soutline Series,TMH.

4. Deitel & Deitel. Java TM: How to Program, PHI(2007)

SUGGESTEDCO-CURRICULARACTIVITIES:

2. Conduct coding competitions focused on object-oriented programming concepts in Java

3. Provide students with real-world scenarios and ask them to solve the given problems.

4. Assign group projects that require students to work together to create Java programs using OOP concepts

Course 10: Object Oriented Programming through Java

Credits -1

OBJECT ORIENTATEDPROGRAMMINGTHROUGH JAVA- PRACTICAL

1. Write a program to read Student Name, Reg.No, Marks [5] and calculate Total, Percentage, Result .Display all the details of students

2. Write a program to perform the following String Operations
    a. Read a string
    b. Find out whether there is a given 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. JavaprogramtoimplementsAdditionandMultiplicationoftwoNXNmatrices.

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, and Age)and Student (Admission Number, College, Course, Year)classes where read Data(),display Data()are overriding methods.

7. Java program for implementing Interfaces

8. Java program on Multiple Inheritance.

9. JavaprogramfortodisplaySerialNumberfrom1toNbycreating two Threads

10. Java program to demonstrate the following exception handlings
    a. Divided by Zero

b. Array Index Out of Bound

c. Arithmetic Exception

d. User Defined Exception

11. Create an Applet to display different shapes such as Circle ,Oval, Rectangle, Square and Triangle.

12. Write a program to create Book (ISBN, Title, Author, Price, Pages, Publisher) table 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 detail using ISBN

d. Delete book details for a given ISBN and display list of remaining Books

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

SUBJECT: OOP'S THROUGH JAVA **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			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 Short Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-II Essay Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

Percentage of choice given = $\frac{95 - 50}{95} \times 100 = \frac{45}{95} \times 100 = 45.95\%$

P R GOVT COLLEGE(AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
II B.Sc (IT) Semester- IV (2024-25)
OOP'S THROUGH JAVA

MODEL PAPER

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

SECTION-I

Answer Any Three Questions. At least 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 exceptional handling is done in java.

SECTION-II

Answer any FOUR Questions. Each question carries 5 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.

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

DEPARTMENT OF COMPUTER APPLICATIONS
MODEL BLUEPRINT
II B.Sc-IT SEMESTER-IV(W.E.F. 2024-25)

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

Model Blueprint 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

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					
	Data Structures Using Python	**II B.Sc (IT)** **Sem - IV** **2024-25**			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	3	-	1	4

Course Objective

1. Understand the basics of Data Science
2. Understand the syntax of Python programming language.
3. Apply python programming skills to solve problems.

Course Outcomes

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

Outcome	Description	Cognitive Level
CO1	Understand basic concepts of Programming	Knowledge
CO2	Understand why python is a useful scripting language for developers.	Knowledge
CO3	Use standard programming constructs like selection and repetition.	Analysis and Evaluation
CO4	Use aggregated data (list, tuple, and dictionary).	Application
CO5	Implement functions and modules	Creativity

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

DEPARTMENT OF COMPUTER APPLICATIONS

II B.Sc. – IT Semester – IV (W.E.F. 2024-25)

Data Structures Using Python

SYLLABUS

UNIT I

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

UNIT II

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

UNIT III

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 - The Binary Tree Abstract Data Type, Properties of Binary Trees; Implementing Trees - 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

TEXTBOOKS:

1. Data structures and Algorithms in Python, M.T.Goodrich, R.Tomassia and Michael H. Goldwasser, Wiley Student Edition.
2. Data structures and Algorithms using Python, RanceD.Necaise,Wiley Student Edition.

REFERENCE BOOKS:

1. Introduction to Programming in Python, Robert Sedgewick, Kevin Wayne and Robert Dondero, Pearson.
2. Python Programming, Sheetal Taneja and Naveen Kumar, Pearson.
3. Exploring Python, Timothy A.Budd, Tata McGraw-Hill Edition.
4. Think Python, Allen Downey, O'Reilly's.
5. Python Programming, Renanthera, Oxford University Press.

IV. RECOMMENDED CO-CURRICULAR ACTIVITIES:

1. Organize coding competitions on implementing and solving data structure problems using Python

2. Assignments to reinforce the understanding of different data structures and their operations.

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

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

DEPARTMENT OF COMPUTER APPLICATIONS

II B.Sc – IT Semester – IV (W.E.F. 2024-25)

Data Structures Using Python

PRACTICAL

1. Write a program to read „N" numbers of elements into an array and also perform the
2. 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
3. Write Programs to implement the Stack operations using an array
4. Write Programs to implement the Stack operations using Linked List.
5. Write Programs to implement the Queue operations using an array.
6. Write Programs to implement the Queue operations using Linked List.
7. Write a program for Binary Search Tree Traversals
8. Write a program to implement dequeuer using a doubly linked list.
9. Write a program to search an item in a given list using Binary Search
10. Write a program for implementation of the Quick sort
11. Write a program for implementation of Insertion sort
12. Write a program to implement DFS graph traversals algorithm
13. 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. 2024-25)
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			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 Short Questions	**6**	**10**	**60**	**3**	**10**	**30**
2	Section-II Essay Questions	**7**	**5**	**35**	**4**	**5**	**20**
TOTAL		**13**		**95**	**TOTAL MARKS**		**50**

Percentage of choice given = $\frac{95 - 50}{95} \times 100 = \frac{45}{95} \times 100 = 45.95\%$

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

DEPARTMENT OF COMPUTER APPLICATIONS

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

II B.Sc-IT Semester -IV

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

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

SECTION-I

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

Part-A

1. Explain Features of 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 Linked List.

5. Define Tree? And Explain Properties of a Tree..

6. Define Graph? Explain Graph ADT.

SECTION-II

Answer any FOUR Questions. Each question carries 5 marks **(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.

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
DEPARTMENT OF COMPUTER APPLICATIONS
MODEL BLUEPRINT
II B.Sc-IT SEMESTER-IV (W.E.F. 2024-25)

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

Model Blueprint 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

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															