

**PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A), KAKINADA  
DEPARTMENT OF COMPUTER APPLICATIONS**

Meeting of the Board of studies is held at 11:00 AM (online) on 30-04-2024 in the Department of Computer Applications, **PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A), KAKINADA** with the following agenda.

**Agenda**

1. a) To approve the curriculum, blue print and model paper for 1st year B.Sc Information Technology (hon's) under CBCS based as per the directions of the APSCHE for the admitted batch 2024 -25 (I & II Semesters).
- b) To approve the curriculum, blue print and model paper of practical examinations for 1st year B.Sc Information Technology (hon's) under CBCS based as per the directions of the APSCHE for the admitted batch 2024 -25.(I & II Semesters).
2. To approve the curriculum, blue print and model paper for 2nd year B.Sc Information Technology (hon's) Course under CBCS based as per the directions of the APSCHE for the admitted batch 2023-24 (III & IV Semesters)
3. To approve the curriculum, blue print and model paper for 3rd year B.Sc Course under CBCS based as per the directions of the APSCHE for the admitted batch 2022 -23(V & VI Semesters)
4. To approve the Two Certificate Courses (SPSS, Descriptive statistics using R) one for statistics students were introduced in this academic year
5. To approve to introduce Additional inputs to various courses (where ever necessary).
6. To approve the Examination procedure for the courses for I, II, III years of B.Sc (2024 – 25, 2023-24 & 2022-23 admitted batches).
  - 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, and internal assessment would be for 50 Marks for I ,II &III year

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)

### **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 the student should attempt **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.
- Question paper is to be given as per the following structure for the courses with **4 units**

S.No	Unit No	Long Answer Question(10)	Short Answer Question(5 M)	Objective Questions(1M)
1	I	1	0	1
2	II	1	0	1
3	III	0	2	1
4	IV	0	2	1+ one question from any with more syllabus weightage

- For I mid examination to be conducted in offline mode, Question paper is to be given as per the following structure for the courses with **5 units**

S.No	Unit No	Long Answer Question(10M)	Short Answer Question(5 M)	Objective Questions(1M)
1	I	1	0	1
2	II	1	0	1
3	III	0	1	1
4	IV	0	1	1
5	V	0	1+ one question from any unit(III or IV or V) with more syllabus weightage	1

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
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**CIA structure for 3 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 the student should attempt **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 with one mark

➤ 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
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**First Mid Examination is conducted in offline mode (centralised) and Second Mid examination is conducted is same as first mid examination process through online mode (At Department level).**

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

**7. Scheme of Valuation for Practical's**

➤ Record - 10 Marks

➤ Viva voce - 4 Marks

➤ Test - 36 Marks

➤ Total - 50 marks

Answer any 3 questions out of Five questions. Each question carries 12 marks.

8. To award two extra credit to students who have registered and completed SWAYAM course successfully.
9. To award 4 credits for each first and second phases of Apprenticeship between 1st and 2<sup>nd</sup> year and 2<sup>nd</sup> and 3rd year (two summer vacations).
10. To implement pedagogical strategies to enrich teaching and learning process.
11. To approve the proposed departmental activities for 2023-24.
12. To approve the list of examiners and paper setters for the academic year 2023-24.
13. 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, the board come out with the following resolutions.

### **Resolution – I**

It is resolved to approve the following changes of course I,II,III,IV and V of Statistics 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, in the first semester of the first year Course-I & Course-II papers were given as common to each major .Mathematics, Physics, Chemistry and Computer departments have to thought these papers.

### **FIRST YEAR : SEM ONE COURSE-I&COURSE-II**

It is resolved to approved the curriculum, blue print and model paper for 1<sup>st</sup>year B.Sc Information Technology (hon's) Course under CBCS based as per the directions of the APSCHE for the admitted batch 2024 -25. (II Semester)

### **FIRST YEAR : SECOND SEM –MAJOR&MINOR**

COURSE 3& COURSE 4:It is resolved to approved the curriculum, blue print and model paper for 1<sup>st</sup>year B.Sc Information Technology (hon's) under CBCS based as per the directions of the APSCHE for the admitted batch 2024 -25. (II Semester)

### **SEMESTER II : COURSE-III & COURSE-IV**

Question paper model pattern

#### **SECTION I**

Part –A : Given 3 questions

Part –B : Given 3 questions

Write any 3 questions,at least1 question from each part. each question carries 10 marks

## SECTION II

Write any four questions out of seven questions. Each question carries 05 marks

### **SECOND YEAR : THIRD SEM - 4 MAJOR AND 1 MINOR**

**COURSE-V, COURSE-VI, COURSE-VII ,COURSE VIII and MINOR 01** : It is resolved to approved the curriculum, blue print and model paper for 2<sup>nd</sup> year B.Sc Information Technology (hon's) under CBCS based as per the directions of the APSCHE for the admitted batch 2023 -24. (III Semester).

### SEMSTER END MODEL PAPER

#### SECTION I

Part –A : Given 3 questions

Part –B : Given 3 questions

Write any 3 question,at least1 question from each part. each question carries 10 marks

## SECTION II

Write any four questions out of seven questions. Each question carries 05 marks

### **SECOND YEAR : THIRD SEM – 3 MAJOR AND 2 MINOR**

**COURSE-IX, COURSE-X, COURSE-XI and MINOR 02** : It is resolved to approved the curriculum, blue print and model paper for 2<sup>nd</sup> year B.Sc Information Technology(hon's) under CBCS based as per the directions of the APSCHE for the admitted batch 2023 -24. (IV Semester).

### SEMSTER END MODEL PAPER

#### SECTION I

Part –A : Given 3 questions

Part –B : Given 3 questions

Write any 3 questions, at least 1 question from each part. Each question carries 10 marks

## SECTION II

Write any four questions out of seven questions. Each question carries 05 marks

### **Resolution – II**

1. 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.
2. Resolved to adopt Community Service Project for all the students at the end of Sem –II.
3. Resolved to send all the final year Statistics students for on job training apprenticeship In connection with the industries for off-site Project in the end of Sem V/VI with the industries in accordance with their interest of study.
4. It is resolved to approve the proposed departmental activities for 2024-25.
5. It is resolved to approve the list of examiners and paper setters for the academic year 2024-25.
- 6. Streamlining of regularity in attendance. Resolved to make the eligibility to appear for 1<sup>st</sup> mid is 75% of attendance for the 2<sup>nd</sup> 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.**
7. 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.
8. Resolved to Engaging of 7<sup>th</sup> hour of time table.

9. Resolved to conduct International / National , Webinar / Seminar like Data Science, etc.,
10. Resolved to introduce new courses of study whenever necessary.
11. Resolved to follow the admission criteria for the programmes offered by the department.
12. Resolved to conduct extension lectures by the eminent persons.
13. It is resolved to conduct a workshop on SPSS ,by a eminent persons.
- 14.It is resolved to arrange a field trip.

## **ACTUARIAL SCIENCE**

### **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 V framed by APSCHE, the board come out with the following resolutions.

#### **Resolution – I**

It is resolved to approve the following changes of course V of Actuarial science 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, Actuarial science is not considered as either Major /Minor in this academic year then final years are only the running batch.

**PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A), KAKINADA**  
**Department of Computer Applications**

The Board of Studies meeting for **Information Technology** subject during the academic year 2024-2025 is conducted at the Dept. of Statistics on 30.04.2024 (online) at 11:00 AM with Smt P.JYOTHI. , Lecturer In-charge in Statistics the chair along with the following members.

<b>Name with Designation and Address</b>		<b>Signature</b>
Smt. P.Jyothi Lecturer in IN CHARGE P. R. Govt College(A),KAKINADA	Chair Person	
Dr. D. V. RAMANA Murthy Head, Dept.of statistics, SKVT college, Rajahmundry	University Nominee	
i)Dr. N. Madhavi HOD of statistics, Govt. COLLEGE(A), Rajamahendravaram	Subject expert	
ii)Sri. Smt .P.Raja Rajaeswari lecturer in Statistics, Aditya Degree College for Women, Kakinada		
Sri Ch. Tata Rao, A. O LIC, Kakinada.	Industrialist	
<b>Members from the College</b>		
B. Kalyan kumar	Faculty of the Department	
<b>Student Members</b>		
P.Sharon joshna	Student Alumni Member	
T.Akhila I Bsc stat (hon's)	Student Nominee	

R.Pavani priya	I Bsc IT (hon's)	Student Nominee	
B.Yaswath	II MSCS	Student Nominee	
P.lalitha gayatri	II MSCS	Student Nominee	

**P.R. Government College (Autonomous), Kakinada, A.P.**  
**STRUCTURE OF C.B.C.S. MODEL CURRICULUM IN STATISTICS**

Yr.	Sem & Course (Th / Lab)	Course Title	Workload Hrs./week	Credits	Max. Marks		
					Intrnl.	Extrnl	Tot.
<i>I</i>	<b>I Sem. Course-I Theory</b>	Essentials and Applications of Mathematical, Physical and Chemical Sciences	4 Hrs	4	50	50	100
	<b>I Sem. Course-II Theory</b>	Advances in Mathematical, Physical and Chemical Sciences	4Hrs	4	50	50	100
	<b>II sem Course-III Theory</b>	Descriptive Statistics	4Hrs	4	50	50	100
	<b>II sem Course-III Lab</b>	Descriptive Statistics Practical Course	2 Hrs	1	–	–	50
	<b>II sem Course-IV Theory</b>	Random Variables & Mathematical Expectations	4Hrs	4	50	50	100
	<b>II sem Course-IV Lab</b>	Random Variables & Mathematical Expectations Practical Course	2 Hrs	1	–	–	50
<i>II</i>	<b>III SEM Course-5 Theory</b>	Theoretical Discrete Distributions	4Hrs	4	50	50	100
	<b>III Sem Course-5 Lab</b>	Theoretical Discrete Distributions Practical Course	2 Hrs	1	–	–	50
	<b>III SEM Course-6 Theory</b>	Theoretical Continuous Distributions	4Hrs	4	50	50	100
	<b>III SEM Course-6 Lab</b>	Theoretical Continuous Distributions Practical Course	2 Hrs	1	–	–	50
	<b>III SEM Course-7 Theory</b>	Statistical Methods	4Hrs	4	50	50	100

	<b>III SEM Course-7 Lab</b>	Statistical Methods Practical Course	2 Hrs	1	–	–	50
	<b>III SEM Course-8 Theory</b>	Inferential Statistics	4Hrs	4	50	50	100
	<b>III SEM Course-8 Lab</b>	Inferential Statistics Practical Course	2 Hrs	1	–	–	50
	<b>III SEM MINOR</b>	Statistical Methods	4Hrs	4	50	50	100
	<b>MINOR LAB</b>	Statistical Methods Practical Course	2 Hrs	1	–	–	50
	<b>IV SEM COURSE 9 THEORY</b>	Sampling Techniques	4Hrs	4	50	50	100
	<b>IV SEM COURSE 9 LAB</b>	Sampling Techniques Practical Course	2 Hrs	1	–	–	50
	<b>IV SEM COURSE 10 THEORY/MINOR</b>	Design and Analysis of Experiments	4Hrs	4	50	50	100
	<b>IV SEM COURSE 10 /MINOR-LAB</b>	Design and Analysis of Experiments Practical Course	2 Hrs	1	–	–	50
	<b>IV SEM COURSE 11 THEORY/MINOR</b>	Numerical Analysis	4Hrs	4	50	50	100
	<b>IV SEM COURSE 11 LAB /MINOR</b>	Numerical Analysis Practical Course	2 Hrs	1	–	–	50
<b>III</b>	<b>V Sem Course 6A Theory</b>	Operation Research –I	4 Hrs	3	40	60	100
	<b>V Sem Course 6A Lab.</b>	Practical-6A	2 Hrs	2	–	–	50
	<b>V sem Course 7A Theory</b>	Operation Research –II	4 Hrs	3	40	60	100
	<b>V sem Course 7A Lab</b>	Practical-7A	2 Hrs	2	–	–	50
Life Skill Course	<b>II Sem</b>	Elementary Statistics	2 Hrs	2		50	50
Opento all	<b>Certificate Course 01</b>	SPSS	40 Hrs				50

Open to all	<b>Certificate Course 02</b>	Descriptive Statistics with R	40 Hrs				50
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PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
<b>Course Code</b>	<b>Essentials and applications of mathematical, physical and chemical sciences</b>	<b>I B.Sc-(IT)</b> <b>Sem - I</b> <b>2024-25</b>			
<b>Hours</b>	60	L	T	P	C
<b>Pre requisites</b>		4	-	-	4

<b>Course Objective</b>
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. .

<b>Course Outcomes</b>	
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 your college network) and prepare a report covering network architecture.
2. Identify the types of malwares and required firewalls to provide security.
3. Latest Fraud techniques used by hackers

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

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

**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**

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

**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**  
**SEMESTER-I**

**Time: 2Hrs**

**Max. Marks: 50**

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**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.



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA							
<b>Course Code</b>	<b>ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES</b>			<b>I B.Sc-(IT)</b> <b>Sem - I</b> <b>2024-25</b>			
<b>Hours</b>	60			L	T	P	C
<b>Pre requisites</b>				4	-	-	4

Course Objective
<p>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.</p> <p>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.</p>

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)..

**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.

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

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

**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**

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

**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**

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**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.



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
<b>Course Code</b>	<b>PROBLEM SOLVING IN C</b>	<b>I B.Sc- (IT)</b>			
		<b>Sem - II</b>			
		<b>2024-25</b>			
<b>Hours</b>	90 (60 Theory + 30 Practical)	L	T	P	C
<b>Pre requisites</b>		3	-	2	4

<b>Course Objective</b>
<ol style="list-style-type: none"> <li>1. Understand the basics of C</li> <li>2. Understand the syntax of C-programming language</li> <li>3. Apply C-programming skill to solve problems</li> </ol>

<b>Course Outcomes</b>	
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.

**I B.Sc (IT) Semester- II (2024-25)**

**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-programming><http://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

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
<b>TOTAL</b>		<b>13</b>		<b>95</b>	<b>TOTAL MARKS</b>		<b>50</b>

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

**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**

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

**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**

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**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.



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
<b>Course Code</b>	<b>MATHEMATICS FOR COMPUTER SCIENCE</b>	<b>I B.Sc- (IT)</b>			
		<b>Sem - II</b>			
		<b>2024-25</b>			
<b>Hours</b>	90 (60 Theory + 30 Practical)	L	T	P	C
<b>Pre requisites</b>		3	-	2	4

<b>Course Objective</b>
<p>The objective of this course is to provide students</p> <ol style="list-style-type: none"> <li>1.To apply mathematical logic to solve the problems</li> <li>2.To understand sets, relations, functions, groups and discrete structures</li> <li>3.To apply combinations and permutations to real world applications</li> <li>4.To solve real world problems using graphs &amp; trees</li> </ol>

<b>Course Outcomes</b>	
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

**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

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

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

**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**

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

**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**

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**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.



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
<b>Course Code</b>	<b>DATABASE MANAGEMENT SYSTEM</b>	<b>II B.Sc- (IT)</b>			
		<b>Sem - III</b>			
		<b>2024-25</b>			
<b>Hours</b>	90 (60 Theory + 30 Practical)	L	T	P	C
<b>Pre requisites</b>		3	-	2	4

<b>Course Objective</b>
<ol style="list-style-type: none"> <li>1. <i>Understand the role of a database management system in an organization.</i></li> <li>2. <i>Understand basic database concepts, including the structure and operation of the relational data model.</i></li> <li>3. <i>Understand and successfully apply logical database design principles, including E-R diagrams and database normalization</i></li> <li>4. <i>Understand Functional Dependency and Functional Decomposition.</i></li> <li>5. <i>Gets the information about creating tables, modifications of tables etc.</i></li> <li>6. <i>Gets knowledge about writing of PL/SQL program with many options like Triggers, functions, procedures etc.</i></li> </ol>

<b>Course Outcomes</b>	
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 operations, 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)

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

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



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

**MODEL PAPER**

**Time : 2Hrs**

**SEMESTER-II**

**Max. Marks: 50**

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**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							
	<b><u>PYTHON PROGRAMMING</u></b>			<b>II B.Sc (IT) Sem - III 2024-25</b>			
Hours	90 (60 + 30)			L	T	P	C
Pre requisites	Basic Computer Knowledge			4	-	2	5

<b>Course Objective</b>
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-		
<b>Outcome</b>	<b>Description</b>	<b>Cognitive Level</b>
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.GOV.T.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 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).

**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:**

1. "ReemaThareja", Python Programming using problem solving approach, First Edition, Oxford higher Education.

**REFERENCE BOOKS:**

1. 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  $\text{pow}(x, n)$ .
17. Write a Python class to reverse a string word by word

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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**MODEL BLUE PRINT (W.E.F. 2023-24)**  
**II B.SC- (IT) SEMESTER-V**

**SUBJECT:PYTHON PROGRAMMING**  
**PAPER- VII**

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

95 - 50

45

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

95

95

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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**MODEL PAPER (W.E.F. 2023-24)**  
**II B.Sc-IT Semester -III**

**SUBJECT: PYTHON PROGRAMMING**

**Time: 2 Hrs**

**Time: 2 Hrs.**

**SEMESTER-III**

**Max. Marks: 50**

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**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.

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**DEPARTMENT OF COMPUTER APPLICATIONS**

**MODEL BLUEPRINT**

**II B.Sc-IT SEMESTER-V (W.E.F. 2024-25)**

**SUBJECT:PYTHON PROGRAMMING**

**Time: 2 Hrs**

**PAPER-VII**

**Marks: 50**

**Model Blueprint for the question paper setter**

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

**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
4.	Define Set? Explain Set Operations?			

**Unit-4**

1.	Define String? And Explain String Operations in Python.	BT1	CO1	PO1
2.	Describe OOPS and explain Classes and Objects?	BT1	CO2	PO2
3.	Explain Built-In Functions in python.	BT2	CO3	PO3

**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
3.	Explain Exception Handling concept in Python?	BT1	CO2	PO2



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	<b>OPERATING SYSTEM</b>	<b>II B.Sc (IT) Sem - III 2024-25</b>			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	4	-	2	5

<b>Objectives:</b>
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.

<b>Course Learning Outcomes:</b>
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<sup>th</sup> 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

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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**MODEL BLUE PRINT (W.E.F. 2024-25)**

**SUBJECT: OPERATING SYSTEM (PAPER-III)**

**Time: 2Hrs**

**PAPER- III**

**Marks: 50**

**Model blue print for the model paper and choice**

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

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

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**DEPARTMENT OF COMPUTER APPLICATIONS**  
**MODEL BLUE PRINT**  
**III B.SC-IT SEMESTER-III(W.E.F. 2024-25)**

**SUBJECT:OPERATING SYSTEM (PAPER-III)**

**Time: 2 Hrs**

**PAPER-III**

**Marks: 50**

**Model Blue print for the question paper setter**

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

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

**Time:2 ½ Hrs**

**Max. Marks: 50**

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**SECTION -I**

**Answer any three of the following questions. Must attempt atleast 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]

**P.R. GOVT. COLLEGE (A), KAKINADA**  
**II B.Sc (IT) (W.E.F 2024-2025)**  
**SEMESTER – III**  
**QUESTION BANK**

Subject: Operating Systems

Paper: III

**MODULE-I**

**Essay Questions:**

1. Define Operating system? Explain function of Operating System.[BT1]
2. Categorize various types of Operating Systems?[BT2]
3. Discuss about Multiprogramming System?[BT1]
4. Explain about Computer system Architecture ?[BT1]

7.

**Short Questions:**

5. Explain Resource Abstraction?[BT1]
6. Explain about Process Control Block?[BT1]
7. List of various Operations or services in Operating system?[BT1]
8. Differentiate between Real time operating system and Time sharing operating system?[BT2]

8.

**MODULE-II**

**Essay Questions:**

1. Explain about Process Scheduling Algorithms in detail?[BT1]
2. Explain about System view of the Process and Resources?[BT1]
3. Describe about System Call in detail?[BT1]

9.

**Short Questions:**

4. Discuss about CPU Scheduling?[BT1]
5. Define Thread? Explain Threading Issues in OS.[BT1]
6. Define Process? Construct Process State diagram in OS.[BT1,BT3]
7. Explain about Preemptive Scheduling Algorithm[BT1]

**MODULE-III**

**Essay Questions:**

1. Discuss Deadlock Detection and recovery?[BT1]
2. Classify various types of Classical Process Synchronization problem?[BT2]
3. Explain about Deadlock concept in detail?[BT1]

10.

**Short Questions:**

4. Discuss Procedure-Consumer problem?[BT1]
5. Explain about Reader-Writer problem?[BT1]
6. Explain about Semaphores?[BT1]

#### **MODULE-IV**

##### **Essay Questions:**

1. Explain about Paging in Memory Management?[BT1]
2. Describe Segmentation and Memory Allocation Strategies?[BT1]
3. Discuss about Virtual Memory in detail?[BT1]

##### **Short Questions:**

4. Define Virtual memory and explain its advantages?[BT1]
5. Explain about Segmentation?[BT1]
6. Write about Fixed and Variable Partitions?[BT1]

#### **MODULE-V**

##### **Essay Questions:**

1. Explain about File Access Methods?[BT1]
2. Discuss Android Development Framework? ?[BT1]
3. Explain about Android Application Architecture? ?[BT1]

##### **Short Questions:**

4. Write about File Operations?[BT1]
5. Explain about File System in Android?[BT1]
6. Discuss about Security policy Mechanism in file system?[BT1]

PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
<b>Course Code</b>	<b>COMPUTER ARCHITECTURE</b>	<b>I B.Sc- (IT)</b>			
		<b>Sem - II</b>			
		<b>2023-24</b>			
<b>Hours</b>	90 (60 Theory + 30 Practical)	L	T	P	C
<b>Pre requisites</b>	Basic computer Applications	3	-	2	4

<b>Course Objective</b>

<b>Course Outcomes</b>	
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

**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

## **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

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

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

**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**

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

**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-II**

**Max. Marks: 50**

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**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 (A), KAKINADA**  
**II B.Sc (IT) (W.E.F 2024-2025)**  
**SEMESTER – III**  
**QUESTION BANK**

**Subject: Computer Architecture**

**Paper: V**

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**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?
9. Why are input-output and interrupt mechanisms crucial in computer systems?

**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 and how does it differ from synchronous data transfer?
3. What is meant by programmed I/O in the context of data transfer?
4. What is Direct Memory Access (DMA) and how does it improve data transfer efficiency?

#### **Short Questions:**

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



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	<b>WEB TECHNOLOGIES</b>	<b>II B.Sc (IT)</b>			
		<b>Sem - IV</b>			
		<b>2024-25</b>			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites		4	-	2	5

<b>Course Objective</b>
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**

<b>Outcome</b>	<b>Description</b>	<b>Cognitive Level</b>
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(TM H)
7. Internet and Web Basics by Ned Snell, Bob Temple, TM Clark(Pearson)

### **SUGGESTED CO-CURRICULAR ACTIVITIES:**

1. Build a website with 10 pages for the case study identified.
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**  
**PAPER- VII**

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

$$95 - 50 = 45$$

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

$$95 \qquad 95$$

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

**Time : 2Hrs**

**SEMESTER-II**

**Max. Marks: 50**

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**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.



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	<b>OBJECT ORIENTATED PROGRAMMINGTHROUGH JAVA</b>	<b>II B.Sc (IT) Sem - IV 2024-25</b>			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites		4	-	2	5

<b>Course Objective</b>
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**

<b>Outcome</b>	<b>Description</b>	<b>Cognitive Level</b>
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 using 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)

### SUGGESTED CO-CURRICULAR ACTIVITIES:

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 ORIENTATED PROGRAMMING THROUGH JAVA- PRACTICAL

2. Write a program to read Student Name, Reg.No, Marks [5] and calculate Total, Percentage, Result .Display all the details of students
3. 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
4. Java program to implements Addition and Multiplication of two N X N matrices.
5. Java program to demonstrated use of Constructor.
6. Calculate area of the following shapes using method overloading.
  - a. Triangle
  - b. Rectangle
  - c. Circle
  - d. Square
7. 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.
8. Java program for implementing Interfaces
9. Java program on Multiple Inheritance.
10. Java program to display Serial Number from 1 to N by creating two Threads
11. 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

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

13. 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.GOV'T. 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**  
**PAPER- VII**

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

$$95 - 50 = 45$$

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

$$95 \qquad 95$$

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

**Time : 2Hrs**

**SEMESTER-II**

**Max. Marks: 50**

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**SECTION-I**

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

**Part-A**

14. Long Answer Question1.
15. Long Answer Question2.
16. Long Answer Question3.

**Part-B**

17. Long Answer Question1.
18. Long Answer Question2.
19. Long Answer Question3.

**SECTION-II**

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

20. Short answer question1.
21. Short answer question2.
22. Short answer question3.
23. Short answer question4.
24. Short answer question5.
25. Short answer question6.
26. Short answer question7.



PR GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA					
	<b>Data Structures Using Python</b>	<b>II B.Sc (IT)</b>			
		<b>Sem - IV</b>			
		<b>2024-25</b>			
Hours	90 (60 + 30)	L	T	P	C
Pre requisites	Basic Computer Knowledge	4	-	2	5

<b>Course Objective</b>
<ol style="list-style-type: none"> <li>1. Understand the basics of Data Science</li> <li>2. Understand the syntax of Python programming language.</li> <li>3. Apply python programming skills to solve problems.</li> </ol>

### Course Outcomes

On completion of the course, the students will be able to-		
<b>Outcome</b>	<b>Description</b>	<b>Cognitive Level</b>
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-Jarník 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.GOV. 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**  
**PAPER- VII**

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

$$95 - 50 \quad 45$$

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

$$95 \quad 95$$

**P.R. GOVT.COLLEGE (AUTONOMOUS), KAKINADA**  
**DEPARTMENT OF COMPUTER APPLICATIONS**  
**MODEL PAPER (W.E.F. 2023-24)**  
**II B.Sc-IT Semester -IV**

**SUBJECT:Data Structures Using Python**

**Time: 2 Hrs**

**Time: 2 Hrs.**

**SEMESTER-III**

**Max. Marks: 50**

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**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.

