DEPARTMENT OF COMPUTER SCIENCE

B.Sc.-Honours
(Computer Science)

Government College (A)

Rajahmundry

Accredited with 'A+' grade by NAAC

2024-25

Proceedings of the Principal, Government College (Autonomous), Rajahmundry
Present: Dr. Ramachandra R.K, M.Sc., Ph.D.

Rc. No. 268/GCRJY /UG-BoS/ 2024-25 dt. 27.04.2024

Sub: Government College (A), Rajamahendravaram- UG Boards of Studies (BoS)-
    Nomination of Members – Orders issued.
Ref: 1. UGC Guidelines of for Autonomous Colleges-2023.
    2. Proc. Of the VC No: ANUR/ ANUR Government College (A) Rajahmundry BOS/2023
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Order

    The Principal, Government College (Autonomous) Rajahmundry is pleased to nominate the following members to UG Board of Studies to frame the syllabus of **Computer Science and Applications subject** in all the semesters duly following the norms of the UGC regulations for the Autonomous colleges 2023.

S. No	Name	Designation
1	Suneel Kumar Duvvuri	Chairman
2	All Faculty members in the department	Member
3	R.V.Satyanarayana PR GOvt. College (A) Kakinada	Subject Expert
4	N. Sridhar GDC (A) Tuni	Subject Expert
5	Dr. V. Persis, ANUR	University Nominee
6	K. Vasantha Kumar Lead SAS Programmer B&P Team, Bangalore	Expert from Corporate Sector
7		Student Nominee

    The above members are requested to attend the BoS meeting in May-2024 and share their valuable views, and suggestions on the following functionaries.

a) Prepare syllabi for the subject keeping in view the objectives of the college, interest of the stake holders and National requirement for consideration and approval of the IQAC and Academic Council
b) Suggest methodologies for innovative teaching and evaluation techniques
c) Suggest the panel of names to the Academic Council for appointment of Examiners
d) Coordinate research, teaching, extension and other activities in the department of the College.
e) Suggest CLO, PLO, PI and subject experts to develop question bank in compliance with Bloom's Taxonomy.

    The above said members are requested to bestow their services for the successful organization of the event.

PRINCIPAL
GOVERNMENT COLLEGE (AUTONOMOUS)
RAJAHMUNDRY

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

COMPOSITION OF BOARD OF STUDIES FOR THE YEAR 2024-25

Chairman	Mr. D.Suneel Kumar, In-charge of the Department, DEPARTMENT OF COMPUTER SCIENCE Government College (A), Rajamahendravaram.
University Nominee	Dr. V Persis Associate Professor Department of Computer Science and Engineering University College of Engineering, Adikavi Nannaya
Subject Expert	R.V.Satyanarayana Lecturer in Computer science PR Govt. College (A) Kakinada
Subject Expert	N. Sridhar Lecturer in Computer science GDC (A) Tuni
Expert from Industry	K. Vasantha Kumar Lead SAS Programmer B&P Team, Bangalore
Entrepreneur	Mr. Ramkumar Ramadevu TedlanceIT Solutions JN Road, Rajahmundry
Members	
Smt U Sandhya Rani	Faculty Member
Mr Devaraju Hanumanthu	Faculty Member
Sri P. Narasinga Rao	Faculty Member
Sri. D. Seetha Ramulu	Faculty Member
Kum S.Jaya Lakshmi	Faculty Member
Smt B.Parameswari	Faculty Member
Smt Ch.Sujatha	Faculty Member
Smt B Rupa Devi	Faculty Member
Smt N Jyothirami	Faculty Member
Ch. Jety	Alumni
V. Sri Ramya	Student

Board of Studies Dated:

Meeting of the Board of studies is held at Digihub in the Department of Computer Science, Govt. College (A), Rajahmundry with the following agenda.

Agenda

- Curriculum Design for all the Semesters for B.Sc. (Honors)-Computer Science, B. Sc. (Honors) Artificial Intelligence

- Designing of Course Outcomes and Course Objectives

- Identifying /inclusion of components of Skill Development, Employability and Entrepreneurship inthe curriculum

- Additional inputs into the curriculum

- Designing Model Question Papers and identifying potential paper setters

- Innovative Teaching – Learning Methodology (Learner Centric)

- Curriculum for the Certificate Courses

- Academic activities of the Department

- Any other proposal with the permission of the chair

(Dr. Suneel Kumar Duvvuri)
CHAIRMAN
BOARD OF STUDIES

Minutes and Resolutions

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

CONSOLIDATED REPORT OF BOARD OF STUDIES FOR THE YEAR 2024-25

The Meeting Board of Studies of Computer Science & Applications department was convened on _____ under the Chairmanship of Mr. Suneel Kumar Duvvuri Head / Lecturer-in-charge of Department of Computer Science and Applications. The following members are present

S.No.	Name	Designation	Signature
1	Dr. V. Persis	University Nominee	
2	Dr. N. Sridhar	Local Nominee	
3	Mr. R V Satyanarayana	Local Nominee	
4	Sri K. Vasantha Kumar	Industrial Nominee	
5	Mr. Ramkumar Ramadevu	Entrepreneur	
6	Smt U Sandhya Rani	Faculty Member	
7	Mr. Devaraju Hanumanthu	Faculty Member	
8	Sri P. Narasinga Rao	Faculty Member	
9	Sri. D. Seetha Ramulu	Faculty Member	
10	Kum S.Jaya Lakshmi	Faculty Member	
11	Smt B.Parameswari	Faculty Member	
12	Smt Ch.Sujatha	Faculty Member	
13	Smt B Rupa Devi	Faculty Member	
14	Smt N Jyothirami	Faculty Member	
15	Ch. Jety	Alumni	
16	V. Sri Ramya	Student	

Government College (Autonomous), Rajahmundry

(Accredited by NAAC "A+" Grade)

Board of Studies Meeting on Department of Computer Science & Applications

List of Paper Setters and Examiners

S No	Name of the Lecturer/Reader/Professor	Papers	College	City
1	Prof P Suresh Varma	ALL	Dept of CSE, AKNU	Rajahmundry
2	Dr V Persis	ALL	Dept of CSE, AKNU	Rajahmundry
3	Dr M Kamala Kumari	ALL	Dept of CSE, AKNU	Rajahmundry
4	Dr P Venkateswara Rao	ALL	Dept of CSE, AKNU	Rajahmundry
5	R V Satyanarayana	ALL	GDC (P R) KAKINADA	Kakinada
6	G Balavenkata Padmanadh	ALL	GDC Mummidivaram	Mummidivaram
7	Dr N Sridhar	ALL	GDC TUNI	Tuni
8	E Jyothikiranmayi	ALL	SCIM GDC Tanuku	Tanuku
9	Rebba Ashok Kumar	ALL	SCIM GDC Tanuku	Tanuku
10	Smt M Rajini	ALL	GDC Ravulapalem	Ravulapalem
11	Dr K Satya Rajesh	ALL	GDC Bantumalli	Bantumalli
12	Vijayadeep gummadi	ALL	GDC (SRR & CVR) VIJAYAWADA	Vijayawaada
13	T Jayakrishna	ALL	GDC (SRR & CVR) VIJAYAWADA	Vijayawaada
14	M. Arun Kumar	ALL	GDC Kovvur	Kovvur
15	Smt N Swarnajyothi	ALL	GDC Kaikaluru	Kaikaluru
16	U Sarala	ALL	GDC AVANIGADDA	Avanigadda
17	Dr A Sivaprasad	ALL	GDC TEKKALI	Tekkali
18	I Srilakshmi	ALL	GDC (W) SRIKAKULAM	Srikakulam
19	Sri B Raghuram	ALL	GDC SEETHAMPETA	Seethampeta
20	Sri B Srinivas	ALL	GDC (M) SRIKAKULAM	Srikakulam
21	Dr K V Sobha Rani	ALL	GDC Ramachandrapuram	GDC Ramachandrapuram
22	R Venakata phani Kumar	ALL	GDC Perumallapuram	Perumallapuram
23	G Satya suneetha	ALL	GDC Kovvuru	Kovvuru

24	Smt U Subhashini	ALL	GDC RAVULAPALEM	Ravulapalem
25	B Rajkumar	ALL	GDC (SRR & CVR) VIJAYAWADA	Vijayawada
26	B Hemaraju	ALL	GDC TEKKALI	Tekkali
27	P Jyothi	ALL	GDC PATHAPATNAM	Pathapatnam
28	S Vani Kumari	ALL	GDC (W) SRIKAKULAM	Pathapatnam
29	Simma Madhavi Latha	ALL	GDC (W) SRIKAKULAM	Pathapatnam
30	V Chandrasekhar	ALL	GDC SEETHAMPETA	Seethampeta
31	Smt J Sharmila Rani	ALL	GDC (M) SRIKAKULAM	Srikakulam
32	Smt K Anusha Devi	ALL	GDC PADERU	Paderu

Government College (Autonomous), Rajahmundry

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

SCHEME OF EVALUATION

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER
(THEORY)
(As Approved in the BOS meeting held on _____)

EVALUATION SCHEME

Standard Operating Procedure for Continuous Internal Assessment (Internal Marks – 50) The Internal marks in all the courses/subjects will be awarded based on continuous internal assessment made during the semester concerned. For each Courses/subject 50 marks are allotted for internal assessment and 50 marks are allotted for the End Semester Examination.

Continuous Internal Evaluation (CIA):

It has been decided to introduce Continuous Internal assessment marks for a total of 50 marks, which are to be distributed as follows:

S.No.	Component			Distributionof Marks
1	CIE I (after completion of 50% of syllabus)			20
2	CIE II (Online Exam)			10
3	ATTENDANCE	Above 95%	5	
		91% to 95%	4	
		86% to 90%	3	
		81% to 85%	2	
		75% to 80%	1	
		Below 75%	0	5
Pedagogical Strategies				
4	Assignment			5
5	Participation or Paper Presentation in Student Seminars/Workshops/GroupDiscussions/ Quiz/ Student Study Project/Field Visit/Survey			5
6	Viva-voce			5
TOTAL				**50**

Component I : CIE I & CIE II (20+10 = 30 Marks)

Two Internal Examinations, out of which one is Mandatorily Online examination, for each Course shall be conducted for assessment. These examinations will be conducted during August/September (CIE –I) and January/February (CIE-II). CIE-I carries 20 marks and CIE-II carries 10 marks. CIE- I will be conducted after completion of 50% of syllabus. The second internal examination, i.e., CIE – II, which is mandatorily online examination will cover the entire syllabus and consists of 20 multiple choice questions having ½ mark for each question. The sum of both the CIEs will be considered for awarding marks for CIA.

Suggestive Question Paper Pattern for CIE I & CIE II (Based on Blooms Taxonomy):

Though the faculty concerned is empowered to adopt their own pattern for question paper, a generaland suggestive model for question paper is given below based on Blooms Taxonomy.

Q No	Learning Objective	Marks
1	Memory based (Remember)	2
2	Understand (Comprehension)	2
3	Application	3
4	Analysis	3
5	Evaluation	5
6	Creativity	5
	TOTAL	20 marks

The active verbs used to frame the question based on Blooms Taxonomy is given below for the convenience.

Active verbs developed based on Bloom's Taxonomy

Knowledge	Understand	Apply	Analyze	Evaluate	Create
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	Identify	Manipulate	survey	grade	produce
discover	indicate	Paint	advertise	measure	rearrange
duplicate	Infer	Prepare	appraise	predict	rewrite
enumerate	relate	produce	Break down	rank	role-play

CIE II will consist of multiple choice questions (MCQs). Number of questions and distribution of marks is at the discretion of the faculty concerned. However, a half an hour exam consisting of 20 MCQs with ½ mark for each question is suggestible in view of the huge number of students. All the HoDs should supply a question bank of MCQs of all the courses covering the entire syllabus along with key to the Computer Science department to enable them to conduct the online examination in the designated laboratories. Alternatively, all the HoDs may upload the MCQs in the portal through their logins.

Further, all the HoDs should submit their schedule of CIE II to IQAC in advance to monitor the systematic conduct of the online examination.

Important Note:

Students who absent themselves from any CIE will lose the marks for the respective test. However, if a student is not able to write the CIE I / II because of his/her participation in an important event related to NSS/NCC or Games/Sports representing the College/University/health grounds, the student has to get the prior permission of the Principal through the proper channel and submit the same to the Office of the Controller of Examinations. Deadline is 7 days after the CIE. Applications submitted after the deadline will not be considered for the retest.

Component III: Attendance (5 Marks)

Attendance mark will be awarded to the students based on their attendance percentage on a particular course. Faculty of each course has to award the attendance mark based on their subject attendance.

The marks split-up is given below

Above 95%	5
91% to 95%	4
86% to 90%	3
81% to 85%	2
75% to 80%	1
Below 75%	0

Component IV: Assignment (5 Marks)

One Assignment for each course must be submitted by a student in each semester. The marks allotted to this component will be awarded based on the performance of the student. The assignment topic may be assigned either individually or group. Assignment should be submitted by the student in the first half of the semester. Also maximum of 7 days should be given to students to submit the assignment. Assignments should be evaluated by the faculty concerned and the same to be verified by the student. The assignment should be kept in department for the Academic Audit by IQAC and also for external academic audit conducted by office of Commissionerate of Collegiate Education. The marks should be awarded by the faculty.

Component V (Pedagogical Strategies):

Participation /Paper Presentation in Student Seminars/Workshops/Group Discussions/ Quiz/ Student Study Project/Field Visit/Survey (5 Marks)

For this component, the marks will be provided to student, if he/she participate/win in the external college technical events. To score marks, the student has to participate / present papers related to subject in the technical events organized in the other colleges/other departments in the college.

	Participation	Second Prize	First Prize / Best Paper
Workshop / Seminar / Technical Symposium	2	3	5
National / International Conference	3	4	5

In case of Classroom seminar, one seminar for each course must be presented by a student in each semester. Each student should be given individual topic for seminar, the student has to submit the seminar topic as assignment and the same will be presented minimum of 10 minutes in the class through ICT. The seminar presented by the student should be evaluated by the subject faculty and

based on the performance of the presentation, the marks will be awarded.

Similarly, reports on field visits, educational tours, study projects in prescribed format will be considered for awarding marks in this component.

For a student who has not participated in any events in that semester, the student will be awarded "0" for this component. If a student participates more than one event and win prize, the best would be considered for the subject.

In case of Quiz, preferably online quiz, it should be conducted after the CIE II and well before the SEE. Faculty concerned has to announce the schedule for the quiz and create the quiz in the ERP (College Management System). The subject staff has to upload all the questions (unit-wise) in the ERP. Quiz should be created with 30 questions (ERP should choose 30 questions randomly out of 100 questions uploaded).The timing for quiz should be 30 minutes. No negative marking. Each question carries 1 mark. The marks secured should be converted to5.

Semester End Examinations (SEE)

The question paper is of 2 ½ duration for 50 marks. The suggestive question paper model given in section 1.1.1.may be used for framing the question. This kind of question paper will be helpful in CO-PO Mapping and thereby graduate attributes.

(Prepared by IQAC & Academic Cell and submitted to the Chairman, IQAC & Principal on 3 April 2019)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

(As Approved in the BOS meeting held on 30 August 2023 For 2023-2024)

S.No.	Description	Marks
1	Procedure Explanation with Coding (including Algorithm & Flowchart if any)	20
2	Execution of Program	10
3	VIVA VOCE	10
4	RECORD **	10
5	EXTERNAL PRACTICAL EXAM (at the end of II, IV& VI Semester)	50
6	Internal Practical Exam (At the end of I, III & V Semester)	50
	GRAND TOTAL	**100**

** Award of marks for number of practicals recorded in the Record.

10 Practicals and Above	10
8 Practicals	8
6 Practicals	6
5 Practicals	5
Less than 5	0

B.Sc. (Honors) Computer Science

Program Specific Outcomes (PSOs)

After completion of the program, the student is able to

PSO1: Problem Solving Proficiency: Proficiently analyze intricate problems, identify requirements, and implement efficient algorithms using appropriate programming languages.

PSO2: Expert Software Development: Expertly design software, architect systems, and develop solutions with an emphasis on scalability, user experience, and best practices.

PSO3: Specialized Knowledge Application: Apply specialized knowledge in areas such as AI, data science, cyber security, contributing to practical problem-solving and innovative solutions.

PSO4: Effective Communication and Collaboration: Communicate technical concepts effectively and collaborate proficiently within multidisciplinary teams, demonstrating leadership and teamwork skills.

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

Credit Framework

Semester	Major* (4 Cr)			Minor (4 Cr)			AECC (3 Cr)			Multi Disny' (2 Cr)			Skill Enhancement Courses (2Cr)			OOTC			Env. Edn (2 Cr)			Total		
	C	H	Cr	C	H	Cr	C	H	Cr	C	H	Cr	C	H	Cr	C	H	Cr	C	H	Cr	C	H	Cr
Sem 1	2*	10	8				2	8	6	1	2	2	2	4	4							7	24	20
Sem 2	2	6+4	8	1	3+2	4	2	8	6				2	4	4							7	27	22
Community Service Project of 180 hours with 4 Credits. Student is eligible for Exit Option-1 with the award of Certificate in respective discipline																								
Sem 3	4	12+8	16	1	3+2	4				1	2	2	1	2	2							7	29	24
Sem 4	3	9+6	12	2	6+4	8				1	2	2	1	2	2							7	29	24
Short-Term Internship/Apprenticeship/OJT of 180 hours with 4 Credits. Student is eligible for Exit Option-2 with the award of Diploma in respective major with minor																								
Sem 5	4	12+8	16	2	6+4	8													1	2	2	7	32	26
Sem 6	Semester Internship/Apprenticeship/OJT with 12 Credits. Student is eligible for Exit Option-3 with the award of Degree in respetive major																							
																		IKS#						
Sem 7	3	9+6	12										2*	6+4	8	1	2	2	1	2	0	6	29	22
Sem 8	3	9+6	12										2*	6+4	8	1	2	2	1	2	0	6	29	22
	21		84	6		24	4		12	3	6	6	10	32	28	2	4	4	2	4	0	47		160
20 Additional Credits for 10 month mandatory Internship/OJT/Apprenticeship																								
C Courses			**H** Hours			**Cr** Credits			**OOTC** Open Online Transdisciplinary															
IKS# Indian Knowledge Systems - Audit Course																								

Total Credits Required for Certificate in Computer Science : 46
Total Credits Required for Diploma in Computer Science with a Minor: 98
Total Credits Required for Degree in Computer Science   :   136
Total Credits Required for Hons Degree in Computer Science: 180

S No	Sem	Course Code	Course type	Title of the Course	CIA	SEE	L	T	P	C
				Courses offered in the Program						
1	I	125701	Major (Multidisciplinary)	Essentials and applications of mathematical, Physical and Chemical sciences	50	50	3	2		4
2	I	125702	Major (Multidisciplinary)	Advances in Mathematical, Physical and Chemical Sciences	50	50	3	2		4
3	II	225701	Major/Minor	Problem Solving using C	50	50	3			3
4	II	225701P	Major/Minor	Problem Solving using C Lab		50			2	1
5	II	225702	Major	Digital Logic Design	50	50	3			3
6	II	225702P	Major	Digital Logic Design Lab		50			2	1
7	III	325701	Major/Minor	Object Oriented Programming using Java	50	50	3			3
8	III	325701P	Major/Minor	Object Oriented Programming using Java Lab		50			2	1
9	III	325702	Major	Data Structures using C	50	50	3			3
10	III	325702P	Major	Data Structures using C Lab		50			2	1
11	III	325703	Major	Computer Organization	50	50	3			3
12	III	325703P	Major	Computer Organization Lab		50			2	1
13	III	325704	Major	Operating Systems	50	50	3			3
14	III	325704P	Major	Operating Systems Lab		50			2	1
15	IV	425701	Major/Minor	Database Management System	50	50	3			3
24	IV	425701P	Major/Minor	Database Management System Lab		50			2	1
17	IV	425702	Major/Minor	Object Oriented Software Engineering	50	50	3			3
18	IV	425702P	Major/Minor	Object Oriented Software Engineering Lab		50			2	1
19	IV	425703	Major	Data Communications and Computer Networks	50	50	3			3
20	IV	425703P	Major	Data Communications and Computer Networks Lab		50			2	1
Note				*Students of Major Discipline have to Opt 2 Pairs (A&B or B&C or A&C) out of the 3 Pairs of courses (A, B, C) given.* *Students of Minor Discipline have to choose 1 Pair (either A or B or C) in Semester V*						
21	V	525701	Major/Minor SET-A	Web Interface Designing Technologies	50	50	3			3
22	V	525701P		Web Interface Designing Technologies Lab		50			2	1
23	V	525702		Web Applications Development using PHP &	50	50	3			3

24	V	525702P		MYSQL Web Applications Development using PHP & MYSQL Lab		50			2	1
25	V	525703	Major/Minor SET-B	Internet of Things	50	50	3			3
26	V	525703P		Internet of Things Lab		50			2	1
27	V	525704		IoT Applications Development and Programming	50	50	3			3
28	V	525704P		IoT Applications Development and Programming Lab		50			2	1
29	V	525705	Major/Minor SET-C	Foundations of Data Science	50	50	3			3
30	V	525705P		Foundations of Data Science Lab		50			2	1
31	V	525706		Application development using Python	50	50	3			3
32	V	525706P		Application development using Python Lab		50			2	1

Major Courses in Semester VII & VIII

S.No	Sem	Course Code	Course type	Title of the Course	CIA	SEE	L	T	P	C
							Hours/week			
				Semester VII Higher Order Thinking Courses						
1	VII	725701	Major	Advanced Data Structures	50	50	3			3
2	VII	725701P	Major	Advanced Data Structures Lab		50			2	1
3	VII	725702	Major	Artificial Intelligence	50	50	3			3
4	VII	725702P	Major	Artificial Intelligence Lab		50			2	1
5	VII	725703	Major	Computer Graphics	50	50	3			3
6	VII	725703P	Major	Computer Graphics Lab		50			2	1
7	VII	725704	Major	Design and Analysis of Algorithms	50	50	3			3
8	VII	725704P	Major	Design and Analysis of Algorithms Lab		50			2	1
9	VII	725705	Major	Principles of Machine Learning	50	50	3			3
10	VII	725705P	Major	Principles of Machine Learning Lab		50			2	1
11	VII	725706	Major	Software Testing	50	50	3			3
12	VII	725706P	Major	Software Testing Lab		50			2	1
				Semester VII Skill Based Courses						
13	VII	725707	Major	Advanced Java Programming	50	50	3			3
14	VII	725707P	Major	Advanced Java Programming Lab		50			2	1
25	VII	725708	Major	MEAN Stack Development	50	50	3			3
16	VII	725708P	Major	MEAN Stack Development Lab		50			2	1
17	VII	725709	Major	Mobile Application Development	50	50	3			3
18	VII	725709P	Major	Mobile Application Development Lab		50			2	1
19	VII	725710	Major	R Programming	50	50	3			3
20	VII	725710P	Major	R Programming Lab		50			2	1

Note: Student has to Choose Any three Courses out of Six from Higher Ordered Thinking Courses and Two Courses out of four from Skill Based Courses

S No	Sem	Course Code	Course type	Title of the Course	CIA	SEE	Hours/week			
							L	T	P	C
Semester VIII Higher Order Thinking Courses										
1	VIII	825701	Major	Big Data Technologies	50	50	3			3
2	VIII	825701P	Major	Big Data Technologies Lab		50			2	1
3	VIII	825702	Major	Compiler Design	50	50	3			3
4	VIII	825702P	Major	Compiler Design Lab		50			2	1
5	VIII	825703	Major	Data Mining Concepts & Techniques	50	50	3			3
6	VIII	825703P	Major	Data Mining Concepts & Techniques Lab		50			2	1
7	VIII	825704	Major	Digital Image Processing	50	50	3			3
8	VIII	825704P	Major	Digital Image Processing Lab		50			2	1
9	VIII	825705	Major	Information Security and Cryptography	50	50	3			3
10	VIII	825705P	Major	Information Security and Cryptography Lab		50			2	1
11	VIII	825706	Major	Mobile ADHOC and Sensor Networks	50	50	3			3
12	VIII	825706P	Major	Mobile ADHOC and Sensor Networks Lab		50			2	1
Semester VIII Skill Based Courses										
14	VIII	825707	Major	Advanced DBMS	50	50	3			3
15	VIII	825707P	Major	Advanced DBMS Lab		50			2	1
24	VIII	825708	Major	Cloud Computing	50	50	3			3
17	VIII	825708P	Major	Cloud Computing Lab		50			2	1
18	VIII	825709	Major	Computer Vision	50	50	3			3
19	VIII	825709P	Major	Computer Vision Lab		50			2	1
20	VIII	825710	Major	Digital Forensics	50	50	3			3
21	VIII	825710P	Major	Digital Forensics Lab		50			2	1

Note: Student has to Choose Any three Courses out of Six from Higher Ordered Thinking Courses and Two Courses out of four from Skill Based Courses

Courses offered in the Program

S No	Sem	Course Code	Course type	Title of the Course		CIA	SEE	L	T	P	C
1	II	225703	Skill Course	Digital Literacy		0	50	2	0	0	2
2	III	325705	Skill Course	Information and Communication Technology	Elective	0	50	2	0	0	2
		325706	Skill Course	Data Analysis							
3	IV	425704	Skill Course	Cyber Security		0	50	2	0	0	2

SEMESTER-I

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

Course Code	Title of the Course	L	T	P	C
125701	**Essentials And Applications of Mathematical Physical and chemical Sciences**	3	2		4
Prerequisites	Basic Mathematics, Physics, Chemistry				

Course Objectives

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

Course Outcomes:

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

Syllabus

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 andproblems

Statistical Measures: Mean, Median, Mode of a data and problems

---

Activity:

1: Complex Number Exploration

- Provide students with a set of complex numbers in both rectangular and polar forms. They will plot the complex numbers on the complex plane and identify their properties

2:Trigonometric Ratios Problem Solving

- Give students a set of problems that require the calculation of trigonometric ratios and their relations.

- Students will solve the problems using the appropriate trigonometric functions (sine, cosine,tangent, etc.) and trigonometric identities.

3: Vector Operations and Applications

- Provide students with a set of vectors in Cartesian form.

- Students will perform vector addition and subtraction operations to find the resultant vectors. They will also calculate the scalar and vector products of given vectors.

4: Statistical Measures and Data Analysis

- Give students a dataset containing numerical values.

- Students will calculate the mean, median, and mode of the data, as well as other statistical measures if appropriate (e.g., range, standard deviation).

- They will interpret the results and analyze the central tendencies and distribution of the data.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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UNIT –II

ESSENTIALS OF PHYSICS:

Definition and Scope of Physics- Measurements and UNIT-s - 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.

Activity:

Concept Mapping:

- Divide students into groups and assign each group one of the topics.

- Students will create a concept map illustrating the key concepts, relationships and applications related to their assigned topic.

- Encourage students to use visual elements, arrows, and labels to represent

- Connections and interdependencies between concepts.

Laboratory Experiment:

- Select a laboratory experiment related to one of the topics, such as motion of objects or electric and magnetic fields.

- Provide the necessary materials, instructions, and safety guidelines for conducting the experiment.

- Students will work in small groups to carry out the experiment, collect data, and analyze the results.

- After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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UNIT –III

ESSENTIALS OF CHEMISTRY:

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

___

Activity:

1: Chemistry in Daily Life Presentation

- Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine, or environmental issues.

- Students will research and create a presentation (e.g., PowerPoint, poster, or video) that showcases the importance of chemistry in their assigned aspect.

2: Periodic Table Exploration

- Provide students with a copy of the periodic table.

- Students will explore the periodic table and its significance in organizing elements based on their properties.

- They will identify and analyze trends in atomic structure, such as electronic configuration, atomic size, and ionization energy.

3: Chemical Changes and Classification of Matter

- Provide students with various substances and chemical reactions, such as mixing acids and bases or observing a combustion reaction.

- Students will observe and describe the chemical changes that occur, including changes in color, temperature, or the formation of new substances.

4: Biomolecules Investigation

- Assign each student or group a specific biomolecule category, such as carbohydrates, proteins, fats, or vitamins. Students will research and gather information about their assigned biomolecule category, including its structure, functions, sources, and importance in the human body.

- They can create informative posters or presentations to present their findings to the class.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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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.

Activity:

1: Interdisciplinary Case Studies

- Divide students into small groups and provide them with interdisciplinary case studies that involve the interdisciplinary application of mathematics, physics, and chemistry.

- Each case study should present a real-world problem or scenario that requires the integration of concepts from all three disciplines.

2: Design and Innovation Project

- Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles.

- Students can choose a specific problem or area of interest, such as renewable energy, environmental conservation, or materials science.

3: Laboratory Experiments

- Assign students laboratory experiments that demonstrate the practical applications of mathematics, physics, and chemistry.

- Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

.   4: Mathematical Modeling

Present students with real-world problems that require mathematical modeling and analysis.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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UNIT- –V

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

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Activity:

- Identifying the attributes of network (Topology, service provider, IP address and bandwidth of your college network) and prepare a report covering network architecture.

- Identify the types of malwares and required firewalls to provide security.

- Latest Fraud techniques used by hackers. Structured Programming Assignment

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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Text Books:

1. Essentials And Applications of Mathematical, Physical and Chemical Sciences: *HK Dass, PS Hemne, RL Madan, Rama Verma, Rajnish Verma, Suneel K Duvvuri*. S.Chand Publications-2023

2. Functions of one complex variable by John.B.Conway, Springer- Verlag.

3. Elementary Trigonometry by H.S.Hall and S.R.Knight

4. 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

Reference Books

1. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.

2. Physics for Technology and Engineering" by John Bird

3. Chemistry in daily life by Kirpal Singh

4. Chemistry of bio molecules by S. P. Bhutan

5. Fundamentals of Computers by V. Raja Raman

6. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

Web Links:

1. https://archive.nptel.ac.in/courses/111/105/111105121/

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
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2	II	2	2	1	21.74%
3	III	2	2	1	21.74%
4	IV	2	1	1	17.39%
5	V	2	1	1	17.39%
		70	16	5	

GOVERdiNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

(Accredited by NAAC "A+" Grade)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

I B.Sc. (Hons) Computer Science   Semester-I

Essentials and Applications of Mathematical, Physical and Chemical Sciences

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
	Answer All Questions			**5 X 7 = 35 M**		
1	Q1 (OR) Q2	7M 7M				
2	Q3 (OR) Q4	7M 7M				
3	Q5 (OR) Q6	7M 7M				
4	Q7 (OR) Q8	7M 7M				
5	Q9 (OR) Q10	7M 7M				
	SECTION – B					
	Answer any Five of the Following			**5 X 2 = 10M**		
6	Q11	2M				

7	Q12	2M				
8	Q13	2M				
9	Q14	2M				
10	Q15	2M				
11	Q16	2M				
12	Q17	2M				
13	Q18	2M				
SECTION – C						
Answer ALL questions		**5 X 1 = 5M**				
14	Q19	1M				
15	Q20	1M				
16	Q21	1M				
17	Q22	1M				
18	Q23	1M				

Course Code	Title of the Course	L	T	P	C
125702	**Advances in Mathematical, Physical and Chemical Sciences**	3	2		4
Prerequisites	Basic Knowledge in Mathematics, Physics & Chemistry				

Course Objectives

1. The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences.

2. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.
CO2	To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.
CO3	Understand the different sources of renewable energy and their generation processes and advances in Nano materials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.
CO4	Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nano sensors. Explore the effects of chemical pollutants on ecosystems and human health.
CO5	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.

CO6	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)

Syllabus

UNIT - I

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

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Activity:

1: Straight Lines Exploration

- Provide students with a set of equations representing straight lines in different forms, such as slope-intercept form, point-slope form, or general form.
- Students will explore the properties and characteristics of straight lines, including their slopes, intercepts, and point of intersection.

2: Limits and Differentiation Problem Solving

- Students will apply the concept of limits to solve various problems using standard limits.
- Encourage students to interpret the results and make connections to real-world applications, such as analyzing rates of change or optimizing functions.

3: Integration Exploration

- Students will explore the concept of integration as a reverse process of differentiation and apply basic methods of integration, such as the product rule, substitution method, or Integration by parts.
- Students can discuss the significance of integration in various fields, such as physics and chemistry

4: Matrices Manipulation

- Students will perform operations on matrices, including scalar multiplication, matrix multiplication, and matrix transpose.
- Students can apply their knowledge of matrices to real-world applications, such as solving systems of equations or representing transformations in geometry.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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UNIT- –II

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.

Activity:

1: Case Studies

- Provide students with real-world case studies related to renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials.
- Students will analyze the case studies, identify the challenges or problems presented, and propose innovative solutions based on the recent advances in the respective field.
- They will consider factors such as energy generation, energy storage, efficiency, sustainability, materials design, biomedical applications, or technological advancements.

2: Experimental Design

- Assign students to design and conduct experiments related to one of the topics: renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials.
- They will identify a specific research question or problem to investigate and design an experiment accordingly. Students will collect and analyze data, interpret the results, and draw conclusions based on their findings.

- They will discuss the implications of their experimental results in the context of recent advances in the field.

3: Group Discussion and Debate

- Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials.
- Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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UNIT- –III

ADVANCES IN CHEMISTRY:

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

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Activity:

Experimental Design and Simulation

- In small groups, students will design experiments or simulations related to the assigned topic. For example, in the context of computer-aided drug design, students could design a virtual screening experiment to identify potential drug candidates for a specific disease target.
- For nano sensors, students could design an experiment to demonstrate the sensitivity and selectivity of nano sensors in detecting specific analytes.
- Chemical biology-related activities could involve designing experiments to study enzyme-substrate interactions or molecular interactions in biological systems.
- Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

Case Studies and Discussion

- Provide students with real-world case studies related to the impact of chemical

pollutants on ecosystems and human health.

- Students will analyze the case studies, identify the sources and effects of chemical pollutants, and propose mitigation strategies to minimize their impact.

- Encourage discussions on the ethical and environmental considerations when dealing with chemical pollutants.

- For the dye removal using the catalysis method, students can explore case studies where catalytic processes are used to degrade or remove dyes from wastewater.

- Students will discuss the principles of catalysis, the advantages and limitations of the catalysis method, and its applications in environmental remediation.

Group Project

- Assign students to work in groups to develop a project related to one of the topics.

- The project could involve designing a computer-aided drug delivery system, developing a nano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on ecosystems.

- Students will develop a detailed project plan, conduct experiments or simulations, analyze data, and present their findings and recommendations.

- Encourage creativity, critical thinking, and collaboration throughout the project.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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UNIT- –IV

ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY

Mathematical Modeling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids

Application of nanotechnology: Nano medicine

Application of biophysics: Biophysical Imaging, Biomechanics, Neuro physics

Application of medical physics: Radiation Therapy, Nuclear medicine Solid waste management, Environmental remediation- Green Technology, Water treatment.

Activity:

1: Mathematical Modelling Experiment

- Provide students with a mathematical modelling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm.

- Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques.

- They will discuss the accuracy and limitations of their model, propose improvements, and interpret the implications of their findings in the context of renewable energy or the specific application area.

2: Case Studies and Group Discussions

- Assign students to analyze case studies related to the applications of mathematical modeling in nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

- Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.

- Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field.

- Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modelling in solving complex problems in these areas.

Group Project

- Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

- The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize waste management practices.

- Students will plan and execute their project, apply mathematical modelling techniques, analyze the results, and present their findings and recommendations.

- Encourage creativity, critical thinking, and collaboration throughout the project.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

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.

Activity:

Students must be able to convert numbers from other number system to binary number systems

1. Identify the networking media used for your college network

2. Identify all the networking devices used in your college premises.

Evaluation Method: Objective-based quiz assessing knowledge and understanding

Text Books:

1. Advances of Mathematical, Physical and Chemical Sciences: *HK Dass, PS Hemne, RL Madan, Rama Verma, Rajnish Verma, Suneel K Duvvuri.* S Chand Publications - 2023

2. Coordinate Geometry by S.L.Lony, Arihant 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

Reference Books

1. Environmental Chemistry by Anil.K.D.E.

2. Digital Logic Design by Morris Mano

3. Data Communication & Networking by Bahrouz Forouzan.

4. Functions of one complex variable by John.B.Conway, Springer- Verlag.

5. Elementary Trigonometry by H.S.Hall and S.R.Knight

6. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd. 4.Basic Statistics by B.L.Agarwal, New age international Publishers

7. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman

8. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker

Web Links:

1. https://archive.nptel.ac.in/courses/111/105/111105121/

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
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3	III	2	2	1	21.74%
4	IV	2	1	1	17.39%
5	V	2	1	1	17.39%
		70	16	5	

Government College (Autonomous) Rajahmundry

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

(Accredited by NAAC "A+" Grade)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

I B.Sc. (Hons) Computer Science   Semester-I

Advances in Mathematical, Physical and Chemical Sciences

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
	Answer All Questions			**5 X 7 = 35 M**		
1	Q1 (OR) Q2	7M 7M				
2	Q3 (OR) Q4	7M 7M				
3	Q5 (OR) Q6	7M 7M				
4	Q7 (OR) Q8	7M 7M				
5	Q9 (OR) Q10	7M 7M				
	SECTION – B					
	Answer any Five of the Following			**5 X 2 = 10M**		
6	Q11	2M				

7	Q12	2M				
8	Q13	2M				
9	Q14	2M				
10	Q15	2M				
11	Q16	2M				
12	Q17	2M				
13	Q18	2M				
SECTION – C						
Answer ALL questions		**5 X 1 = 5M**				
14	Q19	1M				
15	Q20	1M				
16	Q21	1M				
17	Q22	1M				
18	Q23	1M				

SEMESTER-II

Course Code	Title of the Course	L	T	P	C
225701	**Problem Solving using C**	3			3
Prerequisites	Basic Computer Knowledge				

Course Objectives

1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Appreciate and understand the working of a digital computer
CO2	Analyze a given problem and develop an algorithm to solve the problem
CO3	Improve upon a solution to a problem
CO4	Use the 'C' language constructs in the right way
CO5	Design, develop and test programs written in 'C'

Syllabus:

UNIT-I

Introduction to computer and programming: Introduction, Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming, Flowcharts and Algorithms

Fundamentals of C: History of C, Features of C, C Tokens-variables and keywords and identifiers, constants and Data types, Rules for constructing variable names, Operators, Structure of C program, Input /output statements in C-Formatted and Unformatted I/O

Activity: Quiz on computer hardware and software concepts

Evaluation Method: Objective-based quiz assessing knowledge and understanding

UNIT-II

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

Activity: Problem-solving using Decision-Making Statements

 Evaluation Method: Correctness of decision-making logic

UNIT-III

Derived data types in C: Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation.

Strings: Declaring & Initializing string variables; String handling functions, Character handling functions

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Activity: Pair Programming Exercise on Functions

Evaluation Method: Collaboration and Code Quality

UNIT-IV

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

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

Activity: Pair Programming Exercise on Functions

Evaluation Method: Collaboration and Code Quality

UNIT-V

Dynamic Memory Management: Introduction, Functions-malloc, calloc, realloc, free

Structures: Basics of structure, structure members, accessing structure members, nested

structures, array of structures, structure and functions, structures and pointers. **Unions** - Union definition; difference between Structures and Unions.

Activity: Structured Programming Assignment

Evaluation Method: Appropriate use of structures and nested structures

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Text Books

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978-1- 25- 90046-2

2. Herbert Schildt, ─Complete Reference with C, Tata McGraw Hill, 4th Edn., ISBN- 13: 9770070411838, 2000

3. Computer fundamentals and programming in C, REEMA THAREJA, OXFORD UNIVERSITY PRESS

Reference Books

1. E Balagurusamy, COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.

2. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.

3. Henry Mullish&Huubert L.Cooper: The Spirit of C An Introduction to modern Programming, Jaico Pub. House,1996.

4. Y kanithkar, let us C BPB, 13th edition-2013, ISBN:978-8183332430,656 pages.

Web Links:

1. https://nptel.ac.in/courses/106/104/106104128/

2. https://nptel.ac.in/courses/106/105/106105171/

3. https://data-flair.training/blogs/c-tutorial/

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

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CO1														
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Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

I B.Sc. (Hons) Computer Science   Semester-II

Problem Solving using C

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
Answer All Questions		**5 X 7 = 35 M**				
1	a) Explain the basic block diagram of a computer system and explain the functions of its various components.	7M	2	1		
	(OR)					
	b) What is flow chart? Explain various symbols in Flow chart.	3M	2	2		
	c) Write a C program to compute simple interest.	4M	3	3		
2	a) Explain Iterative statements in C with syntax.	7 M	3	4		
	(OR)					
	b) Explain Decision making statements in C Programming with example.	7M	3	4		
3	a) Describe the process of declaring and initializing a two-dimensional array in C programming.	3M	2	4		
	b) Write a C program to perform addition of two matrices.	4M	3	5		
	(OR)					
	b) Explain different string manipulation library functions with example.	7M	3	4		
4	a) Explain auto, extern, static, register storage classes in C with syntax.	7M	3	4		
	(OR)					
	b) What is function? Explain various categories of	7M	3	4		

	functions. Illustrate with example.					
5	a) Explain Dynamic memory allocation mechanism in C with syntax and example.	7M	3	5		
	(OR)					
	b) Explain Structures in C programming with example.	7M	3	4		

SECTION – B

Answer any Five of the Following   **5 X 2 = 10M**

6	What is software? Explain different types of software.	2M	2	1		
7	What is an identifier (variable)? What are the rules to construct identifier (varible)?	2M	2	1		
8	Write a program to find given number is even or odd.	2M	3	3		
9	Write the difference between break and continue statements in C.	2M	2	4		
10	Explain two dimensional arrays in C.	2M	2	4		
11	Create a C program that reads string input from the user and display its length.	2M	3	3		
12	Write a short note on recursion.	2M	2	4		
13	Write the differences between Structures and union in C.	2M	2	4		

SECTION – C

Answer ALL questions   **5 X 1 = 5M**

14	What function concatenates two strings in C?	1M	3	4		
15	What kind of function calls itself?	1M	2	4		
16	What statement is used to skip the current iteration of a loop and continue with the next iteration?	1M	2	3		
17	Which loop ensures the loop body is executed at least once?	1M	3	3		
18	What is the output of the following program. ```c\n#include <stdio.h>\nvoid main()\n{\n int x = 5 * 9 / 3 + 9;\n}\n```	1M	3	1		

Course Code	Title of the Course	L	T	P	C
225701P	**Problem Solving using C Lab**			2	1
Prerequisites	Basic Computer Knowledge				

Objectives:

1. Learn how to solve common types of computing problems.
2. Learn to map problems to programming features of C.

List of Experiments/Syllabus:

1. A. Write a Program to calculate simple & compound interest

   B. Write a C Program to interchange two numbers.
2. Find the biggest of three numbers using C.
3. Write a C Program to find the sum of individual digits of a positive integer.
4. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
5. Write a C Program to check whether a number is Armstrong or not.
6. Write a C Program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a C Program that implements searching of given item in given list
8. Write a C Program that uses functions to perform the following: Addition of two matrices. Multiplication of two matrices.
9. Write a Program for concatenation of two strings.
10. Write a Program for length of a string with and without String Handling functions
11. Write a Program to demonstrate Call by Value and Call by Reference mechanism
12. Write a Program to find GCD of Two numbers using Recursion
13. Write a C Program to perform various operations using pointers.
14. Write a C Program to read data of 10 employees with a structure of 1.employee id 2.aadar no, 3.title, 4.joined date, 5.salary, 6.date of birth, 7.gender, 8.department.
15. Write a Program to demonstrate dynamic arrays using Dynamic Memory Management functions

Reference Books:

1. Henry Mullish&Huubert L.Cooper: The Spirit of C An Introduction to modern Programming, Jaico Pub. House,1996.

2. Y kanithkar, let us C BPB, 13 th edition-2013, ISBN:978-8183332430,656 pages.

Virtual Lab Links:

1. https://cse02-iiith.vlabs.ac.in/

Course Code	Title of the Course	L	T	P	C
225702	**Digital Logic Design**	3			3
Prerequisites	Basic Computer Knowledge				

Course Objectives

1. To familiarize with the concepts of designing digital circuits.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand how to Convert numbers from one radix to another radix and perform arithmetic operations.
CO2	Simplify Boolean functions using Boolean algebra and k- maps
CO3	Design adders and subtractors circuits
CO4	Design combinational logic circuits such as decoders, encoders, multiplexers and demultiplexers.
CO5	Use flip flops to design registers and counters.

Syllabus:

UNIT –I

Number Systems: Binary, octal, decimal, hexadecimal number systems, conversion of numbers from one radix to another radix, r's, (r-1)'s complements, signed binary numbers, addition and subtraction of unsigned and signed numbers, weighted and un-weighted codes.

Activity: JAM (Just a Minute) Session: Explaining Radix Conversion

Evaluation Method: Communication Skills and Knowledge Presentation

UNIT –II

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

Activity: Boolean Algebra Assignment

Evaluation Method: Assignment Completion and Correctness

UNIT –III

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

Activity: Hands-on Lab Activity: Building Adder and Subtractor Circuits

Evaluation Method: Lab Performance and Correctness of Circuit Implementation

UNIT –IV

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

Activity: Group Discussion: Applications of Decoders, Encoders, Multiplexers

Evaluation Method: Participation and Critical Thinking

UNIT –V

Sequential Logic Circuits: Classification of sequential circuits, latch and flip-flop, RS- latch using NAND and NOR Gates, truth tables, RS, JK, T and D flip-flops, truth and excitation tables, conversion of flip- flops, flip-flops with asynchronous inputs (preset and clear).

Design of registers, shift registers, bidirectional shift registers, universal shift register, design of ripple counters, synchronous counters and variable modulus counters.

Activity: Quiz on Flip-Flops and Register-Counter Design

Evaluation Method: Quiz Performance and Knowledge Retention

Text Books:

1. M. Morris Mano, Michael D Ciletti, "Digital Design", 5th edition, PEA.

2. Kohavi, Jha, "Switching and Finite Automata Theory", 3rd edition, Cambridge.

Reference Books

1. Leach, Malvino, Saha, "Digital Principles and Applications", 7th edition, TMH.

2. Roth, "Fundamentals of Logic Design", 5th edition, Cengage.

Web Links:

1. https://nptel.ac.in/courses/106105243

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print					
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
2	II	2	2	1	21.74%
3	III	2	2	1	21.74%
4	IV	2	1	1	17.39%
5	V	2	1	1	17.39%
		70	16	5	

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

(Accredited by NAAC "A+" Grade)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

I B.Sc. (Hons) Computer Science   Semester-II

Digital Logic Design

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
	Answer All Questions		**5 X 7 = 35 M**			
1	a) Convert the following numbers i) $(163.789)_{10}$ to Octal number ii) $(11001101.0101)_2$ to base-16 iii) $(4567)_{10}$ to base 2 iv) $(4D.56)_{16}$ to Binary	4 M	3	1		
	b) Subtract $(1110)_2$ from $(1010)_2$ using 2's complement? (OR) b) Explain Weighted codes with examples.	3M	3	1		
	c) Represent the decimal number 3452 in i) BCD ii) Excess- 3	3M 4M	3 3	1 1		
2	a) Minimize the following expression in SOP form using K-Map $f(a,b,c,d) = \Sigma m(1,2,3,5,6,7,11,12,13,14,15)$	4 M	3	2		
	b) Minimize the following using POS for using K-Map $f(x,y,z) = \pi M(1,2,4,5,7)$ (OR)	3 M	3	2		
	c) Explain basic logic gates: AND, OR, NOT with truth tables.	7M	3	2		
3	a) Explain Half Subtractor and Full subtractor with truth tables and schematic diagram. (OR)	7M	3	3		

	b) Explain ripple adder/subtractor circuit capable of performing both addition and subtraction operations.	7M	3	3		
4	a) Explain operation of 3 to 8 decoder with schematic diagram and truth table.	7M	3	4		
	(OR)	7M	3	4		
	b) Describe the design and operation of priority encoders with schematic diagram.					
5	a) Explain JK-Flip Flop and T-Flip Flop with schematic diagram and truth tables. (OR)	7M	3	5		
	b) Explain Bi-Directional shift register with schematic diagram.	7M	3	5		
SECTION – B					

Answer any Five of the Following   **5 X 2 = 10M**

6	Calculate the 10's complement of the decimal number 7324.	2M	3	1		
7	Write a short note on self-complimentary codes.	2M	3	1		
8	Define Minterm & Maxterm	2M	2	2		
9	Explain Canonical SOP form	2M	2	2		
10	Write the truth table for half adder.	2M	3	3		
11	Write the truth table for full adder	2M	3	3		
12	Write a short note on functionality of Ripple counter.	2M	2	4		
13	Write the differences between latches and flip flops.	2M	2	4		

SECTION – C

Answer ALL questions   **5 X 1 = 5M**

14	Find 1's complement of (110001)_____	1M	3	1		
15	What is the maximum number of different boolean functions involving n Boolean Variables?	1M	2	2		
16	In half adder circuit the inputs are 1, 0 then sum is ___ and carry is _____.	1M	2	3		
17	What circuit converts 2^n input lines to n unique output lines?	1M	2	4		
18	What type of circuit changes state based on clock signal?	1M	2	5		

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

Course Code	Title of the Course	L	T	P	C
225702P	**Digital Logic Design Lab**			2	1
Prerequisites	Basic Computer Knowledge				

Objectives:

1. To prepare students to perform the analysis and design of various digital electronic circuits.

List of Experiments/Syllabus:

The laboratory work can be done by using physical gates and necessary equipment or simulators.

Simulators: https://sourceforge.net/projects/gatesim/ or https://circuitverse.org/ or any free open-source simulator

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean functions using logic gates in both SOP and POS forms
3. Realization of basic gates using universal gates.
4. Design and implementation of half and full adder circuits using logic gates.
5. Design and implementation of half and full subtractor circuits using logic gates.
6. Verification of stable tables of RS, JK, T and D flip-flops using NAND gates.
7. Verification of stable tables of RS, JK, T and D flip-flops using NOR gates.
8. Implementation and verification of Decoder and encoder using logic gates.
9. Implementation of 4X1 MUX and DeMUX using logic gates.
10. Implementation of 8X1 MUX using suitable lower order MUX.
11. Implementation of 7-segment decoder circuit.
12. Implementation of 4-bit parallel adder.
13. Design and verification of 4-bit synchronous counter.
14. Design and verification of 4-bit asynchronous counter.

Reference Books:

1. M. Morris Mano, Michael D Ciletti, "Digital Design", 5th edition, PEA.

Virtual Lab Links:

1. http://mddl-iitb.vlabs.ac.in/

SEMESTER-III

Course Code	Title of the Course	L	T	P	C
325701	**Object Oriented Programming using Java**	3			3
Prerequisites	C Programming				

Course Objectives

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

Course Outcomes

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

CO1	Understand the basic concepts of Object-Oriented Programming and Java Program Constructs
CO2	Implement classes and objects and analyze Inheritance and Dynamic Method Dispatch
CO3	Demonstrate various classes in different packages and can design own packages
CO4	Manage Exceptions and Apply Threads
CO5	Create GUI screens along with event handling

Syllabus:

UNIT –I

OOPs Concepts and Java Programming: Introduction to Object-Oriented concepts, procedural and object-oriented programming paradigm

Java programming: An Overview of Java, Java Environment, Data types, Variables, constants, scope and life time of variables, operators, type conversion and casting, Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format(), Control Statements

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Activity: Quiz on Object-Oriented Programming Concepts and Java Constructs

Evaluation Method: Quiz Performance and Knowledge Retention

UNIT –II

Arrays, Command Line Arguments, Strings-String Class Methods

Classes & Objects: Creating Classes, declaring objects, Methods, parameter passing, static fields and methods, Constructors, and 'this' keyword, overloading methods and access

Inheritance: Inheritance hierarchies, super and subclasses, member access rules, 'super' keyword, preventing inheritance: final classes and methods, the object class and its methods;

Polymorphism: Dynamic binding, method overriding, abstract classes and methods;

Activity: Object-Oriented Programming Assignment: Class Implementation

Evaluation Method: Assignment Completion and Correctness

UNIT –III

Interface: Interfaces VS Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface;

Packages: Defining, creating and accessing a package, understanding CLASSPATH, importing packages.

Exception Handling: Benefits of exception handling, the classification of exceptions, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Activity: Hands-on Lab Activity: Creating and Using Custom Java Packages

Evaluation Method: Lab Performance and Correctness of Code Implementation

UNIT –IV

Multithreading: Differences between multiple processes and multiple threads, thread states, thread life cycle, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, The Console class, Serialization

Activity: Case Study Discussion on where multi-threading is crucial

Evaluation Method: Critical thinking, problem-solving, and presentation skills.

UNIT –V

GUI Programming with Swing- Introduction, MVC architecture, components, containers. Understanding Layout Managers - Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

Activity: GUI design contest using Java Swings

Evaluation Method: GUI design, Visual appearance and user friendliness, usability, and adherence to event handling principles.

Text Books:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

Reference Books

1. Cay S. Horstmann, "Core Java Fundamentals", Volume 1, 11 th Edition, Prentice Hall, 2018.
2. Paul Deitel, Harvey Deitel, "Java SE 8 for programmers", 3rd Edition, Pearson, 2015.
3. S. Malhotra, S. Chudhary, Programming in Java, 2nd edition, Oxford Univ. Press.

Web Links:

1. https://onlinecourses.nptel.ac.in/noc22_cs47/preview

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
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4	IV	2	1	1	17.39%
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Government College (Autonomous) Rajahmundry

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

(Accredited by NAAC "A+" Grade)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc. (Hons) Computer Science   Semester-III

Object Oriented Programming using Java

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
Answer All Questions		**5 X 7 = 35 M**				
1	Explain about Object Oriented concepts in Java. (OR) Explain about data types and operators in Java.	7M 7M	2 2	1 1		
2	Explain about Method overloading and method overriding in Java. (OR) Explain Inheritance and types of Inheritance with example.	7M 7M	3 3	2 2		
3	Explain about Interfaces in Java. (OR) Explain about exception handling techniques in Java.	7M 7M	3 3	3 3		
4	Explain about Inter thread communication in Java. (OR) Explain about byte streams and character streams in Java.	7M 7M	3 3	4 4		
5	Explain about Layout managers in Java. (OR) Explain about Keyboard event handling technique in	7M 7M	3 3	5 5		

	Java with example program.					

SECTION – B

Answer any Five of the Following   **5 X 2 = 10M**

6	Explain a short note on type conversion and type casting.	2M	3	1		
7	Write a short note on scope and lift time of a variables in Java.	2M	3	1		
8	Write a short note "this" and "super" keyword in Java.	2M	2	2		
9	Explain a short note on command online arguments in Java.	2M	2	2		
10	Explain about Array declaration and initialization with example.	2M	3	3		
11	Explain any three character handling functions.	2M	3	3		
12	Explain about recursive functions.	2M	2	4		
13	Explain about differences between structures and unions.	2M	2	5		

SECTION – C

Answer ALL questions   **5 X 1 = 5M**

14	Wrapping of data and functions into a single unit is called _____	1M	3	1		
15	What is constructor?	1M	2	2		
16	What is package?	1M	2	3		
17	What keyword is used to prevent concurrent access to a block of code?	1M	2	4		
18	What layout manager divides the container into five regions?	1M	2	5		

Course Code	Title of the Course	L	T	P	C
325701P	**Object Oriented Programming using Java Lab**			2	1
Prerequisites	C Programming				

Objectives

1. Design & implement object-oriented programming concepts in Java.

List of Experiments

1. Write a Java program to print Fibonacci series using for loop.
2. Write a Java program to calculate multiplication of 2 matrices.
3. Create a class Rectangle. The class has attributes length and width. It should have methods that calculate the perimeter and area of the rectangle. It should have read Attributes method to read length and width from user.
4. Write a Java program that implements method overloading.
5. Write a Java program for sorting a given list of names in ascending order.
6. Write a Java program that displays the number of characters, lines and words in a text file.
7. Write a Java program to implement various types of inheritance
8.   i. Single   ii. Multi-Level   iii. Hierarchical   iv. Hybrid
9. Write a java program to implement runtime polymorphism.
10. Write a Java program which accepts withdraw amount from the user and throws an exception "In Sufficient Funds" when withdraw amount more than available amount.
11. Write a Java program to create three threads and that displays "good morning", for every one second, "hello" for every 2 seconds and "welcome" for every 3 seconds by using extending Thread class.
12. Write a Java program that creates three threads. First thread displays "OOPS", the second thread displays "Through" and the third thread Displays "JAVA" by using Runnable interface.
13. Implement a Java program for handling mouse events when the mouse entered, exited, clicked, pressed, released, dragged and moved in the client area.

14. Implement a Java program for handling key events when the key board is pressed, released, typed.

15. Write a Java swing program that reads two numbers from two separate text fields and display sum of two numbers in third text field when button "add" is pressed.

16. Write a Java program to design student registration form using Swing Controls. The form which having the following fields and button SAVE

17. Form Fields are: Name, RNO, Mailid, Gender, Branch, Address.

Reference Books:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill.

Virtual Lab Links:

1. **https://java-iitd.vlabs.ac.in/**

Course Code	Title of the Course	L	T	P	C
325702	**Data Structures Using C**	3			3
Prerequisites	C Programming				

Course Objectives

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

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand various Data Structures for data storage and processing.
CO2	Realize Linked List Data Structure for various operations
CO3	Analyze step by step and develop algorithms to solve real world problems by implementing Stacks, Queues data structures.
CO4	Understand and implement various searching & sorting techniques.
CO5	Understand the Non-Linear Data Structures such as Binary Trees and Graphs

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

Basic Concepts: Pointers and dynamic memory allocation, Algorithm-Definition and characteristics, Algorithm Analysis-Space Complexity, Time Complexity, Asymptotic Notation

Introduction to Data structures: Definition**,** Types of Data structure, Abstract Data Types (ADT), Difference between Abstract Data Types, Data Types, and Data Structures.

Arrays-Concept of Arrays, Single dimensional array, Two dimensional array, Operations on arrays with Algorithms (searching, traversing, inserting, deleting)

Activity: Algorithm analysis exercises

Evaluation Method: Programming Assignment and Correctness

UNIT –II

Linked List: Concept of Linked Lists, Representation of linked lists in Memory, Comparison between Linked List and Array, Types of Linked Lists - Singly Linked list, Doubly Linked list, Circularly Singly Linked list, Circularly Doubly Linked list;

Implementation of Linked List ADT: Creating a List, Traversing a linked list, Searching linked list, Insertion and deletion into linked list (At first Node, Specified Position, Last node), Application of linked lists

Activity: Presentations on real-life applications of linked lists

Evaluation Method: Presentation skills or reports

UNIT –III

Stacks: Introduction to stack ADT, Representation of stacks with array and Linked List, Implementation of stacks, Application of stacks - Polish Notations - Converting Infix to Post Fix Notation - Evaluation of Post Fix Notation - Tower of Hanoi, Recursion: Concept and Comparison between recursion and Iteration

Queues: Introduction to Queue ADT, Representation of Queues with array and Linked List, Implementation of Queues, Application of Queues Types of Queues- Circular Queues, De-queues, Priority Queue

Activity: Role-playing activities for stack operations

Evaluation Method: Problem-solving skills, communication and collaboration abilities

UNIT –IV

Searching: Linear or Sequential Search, Binary Search and Indexed Sequential Search

Sorting: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort and Merge Sort

Activity: Sorting algorithm analysis and comparison activities

Evaluation Method: Performance analysis and presentation.

UNIT –V

Binary Trees: Concept of Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Applications of Binary Tree.

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs (DFS, BFS), Application of Graphs.

Activity: Case Study on Applications of Graphs

Evaluation Method: Critical thinking, problem-solving, and presentation skills

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Text Books:

1. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.
2. A.K. Sharma ,Data Structure Using C, Pearson Education India.
3. "Data Structures Using C" Balagurusamy E. TMH

Reference Books

1. "Data Structures through C", Yashavant Kanetkar, BPB Publications
2. Rajesh K. Shukla, "Data Structure Using C and C++" Wiley Dreamtech Publication.
3. Lipschutz, "Data Structures" Schaum's Outline Series, Tata Mcgraw-hill Education (India) Pvt. Ltd .
4. Michael T. Goodrich, Roberto Tamassia, David M. Mount "Data Structures and Algorithms in C++", Wiley India.

Web Links:

1. https://nptel.ac.in/courses/106102064

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

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CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
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GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc. (Hons) Computer Science   Semester-III

Data Structures using C

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
Answer All Questions		**5 X 7 = 35 M**				
1	Explain about types of data structures with examples. (OR) Explain about operations of an Array with examples.	7M 7M	2 2	1 1		
2	Explain about Linked List and its operations. (OR) Explain Circular Linked List with example.	7M 7M	3 3	2 2		
3	Explain about Towers of Hanoi algorithm with example. (OR) Explain about Queue data structure and its operations.	7M 7M	3 3	3 3		
4	Explain about Quick sort algorithm with example. (OR) Explain about Indexed Sequential search with example.	7M 7M	3 3	4 4		
5	Explain about Binary Tree Traversal algorithms. (OR)	7M 7M	3 3	5 5		

	Explain Breadth First Search and Depth First Search algorithms with examples.					

SECTION – B						
Answer any Five of the Following				**5 X 2 = 10M**		
6	Write a short note on Asymptotic notation.	2M	3	1		
7	Write a short note on space complexity and time complexities with examples.	2M	3	1		
8	Write the differences between Arrays and Linked List.	2M	2	2		
9	Explain applications of Linked List.	2M	2	2		
10	Explain about recursion, advantages and disadvantages of recursion.	2M	3	3		
11	Explain about applications of stack.	2M	3	3		
12	Explain about Bubble sort with example.	2M	2	4		
13	Explain about Linear search with example.	2M	2	5		
SECTION – C						
Answer ALL questions				**5 X 1 = 5M**		
14	What is the notation used to describe the upper bound of an algorithm's running time?	1M	3	1		
15	What data structure consists of nodes containing data and a reference to the next node?	1M	2	2		
16	What data structure operates on a Last In, First Out basis?	1M	2	3		
17	What is the time complexity of bubble sort.	1M	2	4		
18	What is the maximum number of children a node in a binary tree can have?	1M	2	5		

Course Code	Title of the Course	L	T	P	C
325702P	**Data Structures Using C Lab**			2	1
Prerequisites	C Programming				

Objectives:

1. Able to implement efficient algorithms using various data structures.

List of Experiments:

1. Write a Program to read 'N' numbers of elements into an array and also perform the following operation on an array

   a. Add an element at the beginning of an array

   b. Insert an element at given index of array

   c. Update an element using a values and index

   d. Delete an existing element

2. Write Program to implement Single Linked List with insertion, deletion and traversal operations

3. Write Program to implement Circular doubly Linked List with insertion, deletion and traversal operations

4. Write Programs to implement the Stack operations using an array

5. Write a Program using stacks to convert a given infix expression to postfix

6. Write Programs to implement the Stack operations using Liked List.

7. Write Programs to implement the Queue operations using an array.

8. Write Programs to implement the Queue operations using Liked List.

9. Write a Program for Binary Search Tree Traversals

10. Write a Program to search an item in a given list using the following Searching Algorithms

    a. Linear Search

b. Binary Search.

11. Write a Program for implementation of the following Sorting Algorithms

      a. Bubble Sort

      b. Insertion Sort

      c. Quick Sort

Reference Books:

1. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.

Virtual Lab Links:

1. https://cse01-iiith.vlabs.ac.in/

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Curriculum 2024-25   Version: 1.0

Course Code	Title of the Course	L	T	P	C
325703	**Computer Organization**	3			3
Prerequisites	Digital Logic design				

Course Objectives

1. To familiarize with organizational aspects of memory, processor and I/O.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Identify different types of instructions
CO2	Differentiate between micro-programmed and hard-wired control units.
CO3	Analyse the performance of hierarchical organization of memory.
CO4	Summarize different data transfer techniques.
CO5	Demonstrate arithmetic operations on fixed- and floating-point numbers and illustrate concepts of parallel processing.

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.

Activity: Quiz competition on micro-operations.

Evaluation Method: Accuracy and speed in answering quiz questions.

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.

Activity: Instruction Format Puzzle: Solving a puzzle to decode and understand instruction formats.

Evaluation Method: Accuracy and speed in completing the puzzle.

UNIT –III

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

Activity: Memory Hierarchy Poster: Creating informative posters or infographics on memory hierarchy.

Evaluation Method: Clarity of information, presentation and creativity of visual design.

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).

Activity: I/O Troubleshooting Challenge

Evaluation Method: Problem identification, feasibility of proposed solutions, and clarity of explanations.

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.

Activity: Case Study on Parallel processing architecture.

Evaluation Method: Understanding of parallel processing concepts and architectures.

Text Books:

1. M. Moris Mano, "Computer Systems Architecture", 3rd edition, Pearson/ PHI.

Reference Books:

1. Carl Hamacher, ZvonksVranesic, SafeaZaky, "Computer Organization", 5th edition, McGraw Hill.
2. William Stallings, "Computer Organization and Architecture", 8th edition, Pearson/PHI.

Web Links:

1. https://nptel.ac.in/courses/106105243

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
2	II	2	2	1	21.74%
3	III	2	2	1	21.74%
4	IV	2	1	1	17.39%
5	V	2	1	1	17.39%
		70	16	5	

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc. (Hons) Computer Science   Semester-III

Computer Organization

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
Answer All Questions				**5 X 7 = 35 M**		
1	Design Arithmetic Logic Shift Unit.	7M	3	1		
	(OR)					
	Explain about Memory reference instructions.	7M	2	1		
2	Explain about addressing modes with example.	7M	3	2		
	(OR)					
	Explain about control memory.	7M	3	2		
3	Explain about cache memory and mappings.	7M	3	3		
	(OR)					
	Explain about Associative memory.	7M	3	3		
4	Explain about Asynchronous data transfer modes.	7M	3	4		
	(OR)					
	Explain about Priority Interrupt.	7M	3	4		
5	Explain about Multiplication and division algorithms.	7M	3	5		
	(OR)					
	Explain about Addition and Subtraction algorithm.	7M	3	5		
	SECTION – B					
Answer any Five of the Following				**5 X 2 = 10M**		
6	Write a short note on Instruction Cycle.	2M	3	1		

7	Write a short note on interrupts.	2M	3	1		
8	Write a short note on address sequencing.	2M	2	2		
9	Write a short note on memory hierarchy.	2M	2	2		
10	Write a short note on memory hierarchy.	2M	3	3		
11	Write a short note on Main memory.	2M	3	3		
12	Write a short note on peripheral devices.	2M	2	4		
13	Write a short note Instruction pipe line.	2M	2	5		
	SECTION – C					
	Answer ALL questions **5 X 1 = 5M**					
14	What is the first phase of the instruction cycle where the next instruction is read into the CPU?	1M	3	1		
15	What type of control unit uses fixed logic circuits to control signals?	1M	2	2		
16	What is a small, high-speed storage device between the CPU and main memory?	1M	2	3		
17	What technique allows peripherals to transfer data directly to and from memory?	1M	2	4		
18	What technique involves breaking down tasks into smaller subtasks that can be processed concurrently?	1M	2	5		

Course Code	Title of the Course	L	T	P	C
325703P	**Computer Organization Lab**			2	1
Prerequisites	Digital Logic Design				

Objectives:

1. To develop applications using Assembly language code, familiarizes with open-source assembler.

Lab Experiments

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 non-restoring division algorithm.
9. Write assembly language code for A+B*(C-D) using various instruction formats in MASM or any open-source assembler.
10. Write assembly language code for A+B*C using various addressing modes in MASM or any open-source assembler.

Reference Books:

1. M. Moris Mano, "Computer Systems Architecture", 3rd edition, Pearson/ PHI.

Virtual Lab Links:

1. https://coa-iitkgp.vlabs.ac.in/

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

Course Code	Title of the Course	L	T	P	C
325704	**Operating Systems**	3			3
Prerequisites	Basic Computer Knowledge				

Course Objectives

1. To gain knowledge about various functions of an operating system like memory management, process management, device management, etc.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Demonstrate knowledge and comprehension of operating system functions.
CO2	Analyze different process scheduling algorithms and apply them to manage processes and threads effectively
CO3	Create strategies to prevent, detect, and recover from deadlocks, and design solutions for inter-process communication and synchronization problems.
CO4	Compare and contrast different memory allocation strategies and evaluate their effectiveness
CO5	Evaluate disk scheduling algorithms while implementing OS security measures

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.

Activity: Case Study on a specific Operating System: highlighting its functions and key features.

Evaluation Method: Case study presentation, depth of understanding of operating system functions, and ability to articulate key concepts.

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.

Activity: Comparison Poster on Scheduling Algorithms

Evaluation Method: Assessment of posters based on content accuracy, clarity of information, visual presentation, and ability to convey key insights.

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, Methods for Inter process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

Activity: Assignment on Dead Lock prevention techniques

Evaluation Method: Understanding, Completion and report.

UNIT –IV

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

Activity: Debate on various Memory allocation schemes

Evaluation Method: Debate arguments, ability to counter opposing viewpoints, logical reasoning, and presentation skills.

UNIT –V

File and I/O Management, OS security: Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Disk Scheduling algorithms.

Activity: Comparative study of various disk scheduling algorithms using real world datasets

Evaluation Method: Analysis methodology, accuracy of results, and presentation of findings and conclusions.

Text Books:

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7th Edition) Wiley India Edition.

Reference Books

1. Operating Systems: Internals and Design Principles by Stallings (Pearson)
2. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)

Web Links:

1. https://archive.nptel.ac.in/courses/106/105/106105214/

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
2	II	2	2	1	21.74%
3	III	2	2	1	21.74%
4	IV	2	1	1	17.39%
5	V	2	1	1	17.39%
		70	16	5	

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc. (Hons) Computer Science   Semester-III

Operating Systems

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
SECTION – A						
Answer All Questions		**5 X 7 = 35 M**				
1	Discuss about types of Operating Systems.	7M	2	1		
	(OR)					
	Explain about functions of operating systems.	7M	2	1		
2	Explain about preemptive scheduling algorithms. Illustrate with example.	7M	3	2		
	(OR)					
	Explain about non preemptive scheduling algorithms.	7M	3	2		
3	Explain Dead lock avoidance algorithm.	7M	3	3		
	(OR)					
	Discuss methods of Inter process communication.	7M	3	3		
4	Explain about paging and segmentation techniques with examples.	7M	3	4		
	(OR)					
	Explain virtual memory concept with examples.	7M	3	4		
5	Explain about disk scheduling algorithms.	7M	3	5		
	(OR)					
	Explain File allocation methods with example.	7M	3	5		
SECTION – B						

Answer any Five of the Following		5 X 2 = 10M				
6	Write a short note on work station and hand held devices.	2M	3	1		
7	Write a short note on history of Operating System.	2M	3	1		
8	Write a short note on system calls.	2M	2	2		
9	Write a short note on thread libraries.	2M	2	2		
10	Write a short note on semaphores.	2M	3	3		
11	Write a short note on necessary conditions for deadlock.	2M	3	3		
12	Write a short note on Physical and Virtual address space.	2M	2	4		
13	Write a short note pipes.	2M	2	5		
SECTION – C						
Answer ALL questions		5 X 1 = 5M				
14	What type of system allows multiple programs to run concurrently on a computer?	1M	3	1		
15	What scheduling algorithm allocates CPU to processes without forcibly interrupting them?	1M	2	2		
16	What is a variable used to control access to shared resources among processes?	1M	2	3		
17	What concept allows processes to use more memory than physically available?	1M	2	4		
18	What mechanism allows inter-process communication using a temporary storage area?	1M	2	5		

Curriculum 2024-25   Version: 1.0

Course Code	Title of the Course	L	T	P	C
325704P	**Operating Systems Lab**			2	1
Prerequisites	C Programming				

Objectives:

1. Simulates various functions of an operating system like memory management, process management, device management, etc.

List of Experiments:

1. Illustrate the LINUX commands
   a) pwd
   b) mkdir
   c) rmdir
   d) grep
   e) chmod
   f) ls
   g) rm
   h) cp

2. Write a Program to calculate average waiting time and turnaround time of each process using the following CPU Scheduling algorithm for the given process schedules.
   a) FCFS
   b) SJF
   c) Priority
   d) Round Robin

2. Simulate MVT and MFT memory management techniques

3. Write a Program for Bankers Algorithm for Dead Lock Avoidance

4. Implement Bankers Algorithm Dead Lock Prevention.

5. Write a Program to simulate Producer-Consumer problem.

6. Simulate all Page replacement algorithms.

   e) FIFO
   f) LRU

    g) LFU

    h) Optimal

7. Simulate Paging Techniques of memory management

8. Simulate the following disk scheduling algorithms

    a) FCFS

    b) SSTF

    c) SCAN

    d) CSCAN

Reference Books:

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7th Edition) Wiley India Edition.

Virtual Lab Links:

1. https://naim30.github.io/OS-virtual-lab/

SEMESTER-IV

Course Code	Title of the Course	L	T	P	C
425701	**Database Management Systems**	3			3
Prerequisites	Basic Computer Knowledge				

Course Objectives:

1. To familiarize with concepts of database design

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Differentiate between database systems and file based systems
CO2	Design a database using ER model
CO3	Use relational model in database design
CO4	Use SQL commands for creating and manipulating data stored in databases.
CO5	Write PL/SQL programs to work with databases.

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, costs and risks of database approach.

Activity: Seminar Presentation on Database Management Systems

Evaluation Method: Depth of research, clarity of explanations, ability to address questions and engage the audience.

UNIT –II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization

and specialization, **IS A** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modeling.

Activity: Case Study on EER model

Evaluation Method: Identification of inheritance relationships, effective use of generalization and specialization, and adherence to constraints.

UNIT –III

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms upto 3rd normal form.

Activity: Exercise on Normalization: Assign students a set of unnormalized tables and have
them normalize the tables to third normal form

Evaluation Method: Normalized table designs, identification of functional dependencies,
adherence to normalization rules, and elimination of anomalies.

UNIT –IV

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

Activity: Competition on SQL Query Writing

Evaluation Method: Query correctness, efficiency, proper use of SQL commands, ability
to handle complex scenarios, and creativity in query formulation.

UNIT –V

PL/SQL: Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.

Activity: Peer Review of PL/SQL code

Evaluation Method: Peer evaluation of code quality, adherence to coding standards, proper use of language elements, and logic.

Text Books:

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7th Edition) Wiley India Edition.

Reference Books

1. Database Management Systems by Raghu Ramakrishnan, McGrawhill
2. Principles of Database Systems by J. D. Ullman
3. Fundamentals of Database Systems by R. Elmasri and S. Navathe
4. SQL: The Ultimate Beginners Guide by Steve Tale.

Web Links:

1. https://archive.nptel.ac.in/courses/106/105/106105175/

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

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CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
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GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc. (Hons) Computer Science   Semester-IV

Data Base Management System

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
	Answer All Questions		**5 X 7 = 35 M**			
1	Explain about components of Data Base Management Systems.	7M	2	1		
	(OR)					
	Explain classification of Data Base Management Systems.	7M	2	1		
2	Explain about relationship degree and relationship classification.	7M	4	2		
	(OR)					
	Explain about building blocks of entity relationship diagram.	7M	3	2		
3	Explain CODD rules.	7M	2	3		
	(OR)					
	Explain first normal forms, Second normal forms, third normal forms.	7M	4	3		
4	Explain DDL commands with examples.	7M	3	4		
	(OR)					
	Explain join operation and set operation with examples.	7M	3	4		
5	Explain database triggers.	7M	3	5		

	(OR) Explain control structures PL/SQL.	7M	3	5		
SECTION – B						
Answer any Five of the Following			**5 X 2 = 10M**			
6	Write a short note on Data, Information, Database with examples.	2M	3	1		
7	Write a short note on Drawbacks of file-Based System.	2M	3	1		
8	Write a short note on generalization and specialization.	2M	2	2		
9	Write a short note on attribute set classification.	2M	2	2		
10	Write a short note on tuple relational calculus.	2M	3	3		
11	Write a short note on advantages of relational algebra.	2M	3	3		
12	Write a short note on aggregation functions in SQL.	2M	2	4		
13	Explain structure of PL/SQL.	2M	2	5		
SECTION – C						
Answer ALL questions			**5 X 1 = 5M**			
14	Collection of raw facts is called _____	1M	3	1		
15	What is Binary relation ship?	1M	2	2		
16	What is Partial dependency	1M	2	3		
17	Write a Query to update salary to 2000 whose eno=5	1M	3	4		
18	What is procedure is in PL/SQL.	1M	2	5		

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

Course Code	Title of the Course	L	T	P	C
425701P	**Database Management Systems Lab**			2	1
Prerequisites	Basic Computer Knowledge				

Objectives:

1. Design database using Entity Relationship model, write SQL queries for retrieving data from database.

List of Experiments:

1. Draw ER diagram for hospital administration
2. Creation of college database and establish relationships between tables
3. Relational database schema of a company is given in the following figure.

Relational Database Schema - COMPANY

Questions to be performed on above schema

1. Create above tables with relevant Primary Key, Foreign Key and other constraints
2. Populate the tables with data
3. Display all the details of all employees working in the company.
4. Display ssn, lname, fname, address of employees who work in department no 7.
5. Retrieve the Birthdate and Address of the employee whose name is 'Franklin T. Wong'
6. Retrieve the name and salary of every employee
7. Retrieve all distinct salary values

8. Retrieve all employee names whose address is in 'Bellaire'

9. Retrieve all employees who were born during the 1950s

10. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)

11. Retrieve the names of all employees who do not have supervisors

12. Retrieve SSN and department name for all employees

13. Retrieve the name and address of all employees who work for the 'Research' department

14. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.

15. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.

16. Retrieve all combinations of Employee Name and Department Name

17. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.

18. Increase the salary of all employees working on the 'Product X' project by 15%. Retrieve employee name and increased salary of these employees.

19. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.

20. Select the names of employees whose salary does not match with salary of any employee in department 10.

21. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.

22. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.

23. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.

24. Select the names of employees whose salary is greater than the average salary of all employees in department 10.

25. Delete all dependents of employee whose ssn is '123456789'.

26. Perform a query using alter command to drop/add field and a constraint in Employee table.

Reference Books:

1. Fundamentals of Database Systems by R. Elmasri and S. Navathe

Virtual Lab Links:

1. **http://vlabs.iitkgp.ernet.in/se/4/theory/**

Course Code	Title of the Course	L	T	P	C
425702	**Object Oriented Software Engineering**	3			3
Prerequisites	Basic Programming Knowledge				

Course Objective:

1. To introduce Object-oriented software engineering (OOSE) - which is a popular technical approach to analyzing, designing an application, system, or business by applying the object-oriented paradigm and visual modeling.

Course Outcomes:

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

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT –I

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

Activity: Group Activity: Design and implement a small OOP project

Evaluation Method: Presentation evaluation rubric, Project evaluation based on OOP
principles.

UNIT –II

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

Activity: Use Case Scenario Presentation & Peer Activity: Review and provide feedback
on each other's use case diagrams

Evaluation Method: Presentation evaluation rubric, Peer feedback assessment.

UNIT –III

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

Activity: Poster Presentation: Illustrate TDD principles and benefits

Evaluation Method: Poster presentation evaluation questions and engage the audience.

UNIT –IV

Software Maintenance and Evolution: Software maintenance basics, refactoring techniques Software version control, Code review and inspection, Software evolution and reengineering

Activity: Peer Activity: Analyze and discuss different maintenance strategies
Evaluation Method: Peer discussion participation evaluation

UNIT –V

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

Activity: Seminar on Design Patterns

Evaluation Method: Depth of research, clarity of explanations, ability to address

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Text Book(s)

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

Reference Books

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

Web Links:

1. https://archive.nptel.ac.in/courses/106/105/106105153/

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
2	II	2	2	1	21.74%
3	III	2	2	1	21.74%
4	IV	2	1	1	17.39%
5	V	2	1	1	17.39%
		70	16	5	

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

(Accredited by NAAC "A+" Grade)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc. (Hons) Computer Science   Semester-IV

Object Oriented Software Engineering

MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
	SECTION – A					
	Answer All Questions		**5 X 7 = 35 M**			
1	Explain about Object-Oriented Programming (OOP) concepts in detail.	7M	2	1		
	(OR)					
	Explain various steps involved in software development life cycle with examples.	7M	3	1		
2	Explain about requirement analysis and specification.	7M	3	2		
	(OR)					
	Discuss about design patterns.	7M	2	2		
3	Explain about test driven development.	7M	3	3		
	(OR)					
	Explain about various software testing techniques in detail.	7M	4	3		
4	Explain about Software evolution and reengineering	7M	4	4		
	(OR)					
	Explain about code review and inspection.	7M	3	4		
5	Explain about concept based software engineering.	7M	3	5		
	(OR)					
	Explain about aspect oriented programming.	7M	3	5		
	SECTION – B					
	Answer any Five of the Following		**5 X 2 = 10M**			
6	Explain about class and object with examples.	2M	3	1		

7	Write a short note on generalization and specialization.	2M	3	1		
8	Explain about sequence diagram with example.	2M	2	2		
9	Write a short note on state diagram.	2M	2	2		
10	Write a short note on unit testing.	2M	3	3		
11	Write a short note on Integration testing.	2M	3	3		
12	Write a short note on software version control.	2M	2	4		
13	Write a short note on Agile software development.	2M	2	5		
SECTION – C						
Answer ALL questions		**5 X 1 = 5M**				
14	What is Inheritance?	1M	2	1		
15	What diagram illustrates object interactions over time?	1M	2	2		
16	What type of testing focuses on individual components?	1M	2	3		
17	What process improves code without changing its behavior?	1M	2	4		
18	What approach uses models as primary artifacts in software development?	1M	2	5		

Course Code	Title of the Course	L	T	P	C
425702P	**Object Oriented Software Engineering Lab**			2	1
Prerequisites	Basic Computer Knowledge				

Objectives:

1. Develop SRS document, System design using UML.

List of Experiments:

Suggested Software Tools: StarUML/UMLGraph/Topcased/Umberollo/ArgoUML/ Eclipse IDE, Visual Paradigm for UML/Rational Software Architect/Any other Open Source Tool

Select domain of interest (e.g. College Management System) and identify multi-tier software application to work on (e.g. Online Fee Collection). Analyze, design and develop this application using OOSE approach:

1. Develop an IEEE standard SRS document. Also develop risk management and project plan (Gantt chart).
2. Understanding of System modeling: Data model i.e. ER – Diagram and draw the ER Diagram with generalization, specialization and aggregation of specified problem statement
3. Understanding of System modeling: Functional modeling: DFD level 0 i.e. Context Diagram and draw it
4. Understanding of System modeling: Functional modeling: DFD level 1 and DFD level 2 and draw it.
5. Identify use cases and develop the use case model.
6. Identify the business activities and develop an UML Activity diagram.
7. Identity the conceptual classes and develop a domain model with UML Class diagram.
8. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
9. Draw the state chart diagram.
10. Identify the user interface, domain objects, and technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
11. Implement the technical services layer.
12. Implement the domain objects layer.

13. Implement the user interface layer.
14. Draw component and deployment diagrams.

Reference Books:

1. Requirements engineering: processes and techniques, G.Kotonya and, I.Sommerville, 1998, Wiley

2. Design Patterns, E.Gamma, R. Helm, R. Johnson, and J. Vlissides

Virtual Lab Links:

1. http://vlabs.iitkgp.ac.in/se/

Course Code	Title of the Course	L	T	P	C
425703	**Data Communication and Computer Networks**	3			3
Prerequisites	Basic Computer Knowledge				

Course Objectives

1. To provide students with a comprehensive understanding of networking principles, protocols, and technologies, enabling them to design, analyze, and evaluate efficient and reliable network solutions.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand and apply network applications, hardware, software, and reference models for network communication.
CO2	Design and analyze data link layer protocols, multiple access protocols, and wireless LAN technologies.
CO3	Design routing algorithms, congestion control algorithms, and evaluate network layer protocols for internetworking.
CO4	Analyze transport service, transport protocols, and evaluate UDP and TCP in the internet.
CO5	Understand and evaluate application layer protocols, including DNS, email, WWW, and network management protocols.

Syllabus:

UNIT –I

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

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

Activity: Hands-on exercises to configure network applications

Evaluation Method: Practical skills in configuring network applications, hardware, and software.

UNIT –II

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

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

Activity: Protocol Design and Simulation using simulation tools like NS-3 or Cisco Packet Tracer.

Evaluation Method: Students' ability to design and simulate data link layer protocols and multiple access protocols

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UNIT –III

THE NETWORK LAYER: Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service.

Activity: Guest Lectures and Workshops on routing algorithms, congestion control, and network layer protocols.

Evaluation Method: Students' participation and understanding demonstrated in guest lectures and workshop

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UNIT –IV

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

Activity: Network Monitoring and Traffic Analysis using tools like Wireshark

Evaluation Method: Understanding of transport protocols through their analysis of network traffic and identification of UDP and TCP behavior

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UNIT –V

THE APPLICATION LAYER: Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http.

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

Activity: Group Projects on Network Application Development

Evaluation Method: Group Project Presentations

Text Book(s)

1. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India

Reference Books

1. Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India.
2. Kurose, Ross (2010), Computer Networking: A top down approach, Pearson Education, India.

Web Links:

1. https://archive.nptel.ac.in/courses/106/105/106105183/

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT-	Essay 7M	Short 2 M	One word 1M	Weightage
1	I	2	2	1	21.74%
2	II	2	2	1	21.74%
3	III	2	2	1	21.74%
4	IV	2	1	1	17.39%
5	V	2	1	1	17.39%
		70	16	5	

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc. (Hons) Computer Science   Semester-IV

Data Communication and Computer Networks
MODEL QUESTION PAPER (W.E.F 2024-2025)

Time: 2 ½ Hrs.   **Max Marks: 50**

Q.No	Question	Marks	BL	CO	PO	PI
SECTION – A						
Answer All Questions			**5 X 7 = 35 M**			
1	Explain about OSI reference model.	7M	2	1		
	(OR)					
	Explain about Guided media and unguided media for transmission.	7M	2	1		
2	Explain about sliding window protocol.	7M	3	2		
	(OR)					
	Explain HDLC protocol.	7M	3	2		
3	Explain IPv4 protocol.	7M	3	3		
	(OR)					
	Explain congestion control algorithms.	7M	4	3		
4	Explain TCP protocol.	7M	3	4		
	(OR)					
	Explain UDP protocol.	7M	3	4		
5	Explain Simple mail transfer protocol.	7M	3	5		
	(OR)					
	Explain File Transfer protocol.	7M	3	5		
SECTION – B						
Answer any Five of the Following			**5 X 2 = 10M**			
6	Write a short note on network hardware and software.	2M	3	1		
7	Write a short note on frame relay.	2M	3	1		

8	Write about error detection using parity bit.	2M	2	2		
9	Write a short note on wireless LAN.	2M	2	2		
10	Write a short note on network layer design issues.	2M	3	3		
11	Write a short note on adaptive routing algorithm.	2M	3	3		
12	Write a short note on elements of transport protocol.	2M	2	4		
13	Explain Domain Name System.	2M	2	5		
SECTION – C						
Answer ALL questions			**5 X 1 = 5M**			
14	Which layer is responsible for Routing of data packets across multiple nodes.	1M	2	1		
15	What is a common method for detecting errors using polynomial division?	1M	2	2		
16	Give an example for congestion control algorithm	1M	2	3		
17	Which one is connection oriented protocol	1M	2	4		
18	Which protocol uses both TCP and UDP.	1M	2	5		

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Course Code	Title of the Course	L	T	P	C
425703P	**Data Communication and Computer Networks Lab**			2	1
Prerequisites	Basic Computer Knowledge				

Objectives:

1. To provide students with a comprehensive understanding of networking protocols using Packet Tracer.

List of Experiments:

1. Understanding various network tools in Windows and Linux
2. Study different types of Network devices and Cables
3. Building a Local Area Network
4. Concept of Network IP Address
5. Introduction to Network Simulator – Packet Tracer (PT)
6. Configuration of a Router using Packet Tracer
7. Implementation of a Network using Packet Tracer
8. Implementation of Static Routing using Packet Tracer
9. Implementation of RIP using Packet Tracer
10. Implementation of OSPF using Packet Tracer
11. Implement DNS using packet tracer
12. Implementation of a VLAN using Packet Tracer

Reference Books:

1. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India

Virtual Lab Links:

1. **http://vlabs.iitkgp.ac.in/ant/**

SKILL COURSES

SEMESTER-II

Government College (Autonomous) Rajahmundry

Curriculum 2024-25   Version: 1.0

Course Code	Title of the Course	L	T	P	C
225703	**Digital Literacy**	2			2
Prerequisites					

Course Objectives:

1. This course will provide basic knowledge on Computer.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Perform operations on the computer
CO2	Access the Internet and finding information of interest
CO3	Register for an E-mail account and operating it
CO4	Make bill payments and use other applications of Internet
CO5	Create, edit and format documents using a word processor

Syllabus:

UNIT –I

Operate the elements of a computer and performing operations on the computer

Operate the elements of a computer including power cord, power switch, network connecting cable, USB ports, Mouse operations, Keyboard operations, interface icons, GUI elements, Editing options, perform operations including switching on the computer, logging in, locating a file, opening a file, printing a document, storing a file with proper extension, creating a folder/ sub folder in a volume on hard disk and desktop, shifting files from one folder to another, shutting off the computer

UNIT –II

Access the Internet to browse information and E-mail operation

Access the Internet, use a search engine, find information on the topic of interest, register for a web-based E-mail account, access E-mail with attachments, reply to an E-mail, forward an E-

mail and delete an E-mail message

UNIT –III

Make bill payments, other applications using Internet and word processing

Make utility bill payments, booking bus/train tickets, bank transactions, personal transactions,job search through employment portals, mobile/DTH recharge, word processing basics, creating, editing and formatting of text, saving and printing of word document

Text Books:

1. Appreciation of Digital Literacy Handbook published by Department of Electronics & Information Technology, Ministry of Communications & Information Technology, Government of India

Reference Books:

1. Digital Literacies: Concepts, Policies and Practices (New Literacies and Digital Epistemologies) , by Colin Lankshear (Editor), Michele Knobel (Editor)

Web Links:

1. https://youtu.be/b2X_j5Bz-VM
2. https://youtu.be/jln3-P6L2ro
3. https://youtu.be/cfDisqUMIvw
4. https://youtu.be/3h_PyURcdrc
5. https://youtu.be/EqN0LBcydBg

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														

CO5														

Model Blue print for the question paper setter

S.No.	UNIT	Essay 10 M	Weightage
Blue Print
1	I	3	37.5
2	II	3	37.5
3	III	2	25

Government College (Autonomous) Rajahmundry

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

I B.Sc.   Semester-II

Digital Literacy

MODEL QUESTION PAPER (W.E.F 2023-2024)

Time: 2 ½ Hrs.   Max Marks: 50

SECTION - I

Answer any 5 questions   **5 X 3= 15M**

1. Q1
2. Q2
3. Q3
4. Q4
5. Q5
6. Q6
7. Q7
8. Q8

Course Code	Title of the Course	L	T	P	C
325705	**Information And Communication Technology**	2			2
Prerequisites					

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

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the literature of social networks and their properties.
CO2	Explain which network is suitable for whom.
CO3	Develop skills to use various social networking sites like twitter, flickr, etc.
CO4	Learn few GOI digital initiatives in higher education.
CO5	Apply skills to use online forums, docs, spreadsheets, etc for communication, collaboration and research.
CO6	Get acquainted with internet threats and security mechanisms.

Syllabus:

UNIT –I

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

UNIT –II

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

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

UNIT –III

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

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

Text Books:

1. In-line/On-line : Fundamentals of the Internet and the World Wide Web, 2/e – byRaymond Greenlaw and Ellen Hepp, Publishers : TMH

2. Internet technology and Web design, ISRD group, TMH.

Reference Books:

1. Information Technology – The breaking wave, Dennis P.Curtin, Kim Foley, KunaiSen and Cathleen Morin, TMH.

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print			
S.No.	UNIT	Essay 10 M	Weightage
1	I	3	37.5
2	II	3	37.5
3	III	2	25

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

(Accredited by NAAC "A+" Grade)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc.   Semester-III

Information and Communication Technology

MODEL QUESTION PAPER (W.E.F 2023-2024)

Time: 2 ½ Hrs.   Max Marks: 50

SECTION - I

Answer any 5 questions   **5 X 3= 15M**

1. **Q1**
2. **Q2**
3. **Q3**
4. **Q4**
5. **Q5**
6. **Q6**
7. **Q7**
8. **Q8**

\

Course Code	Title of the Course	L	T	P	C
325706	**Data Analytics**	2			2
Prerequisites					

Course Objectives:

This course aims at acquainting the students with Data Preprocessing and Data analytics.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the framework of big data environment.
CO2	Apply pre-processing techniques that aid in feature selection.
CO3	Classify the data for better understanding.

Syllabus:

UNIT –I

Introduction: Overview, Data Science, Big Data Characteristics, Architecture – Core Layers, service layers; roles in data science team, life cycle of data-centric projects, big data life cycle.

UNIT –II

Pre-processing: Introduction, Measures of Central tendency-Mean, Median, Mode, samplingdistributions, inferential statistics, ANOVA, feature selection-PCA.

UNIT –III

Methods: Association rules, Apriori algorithm, overview of clustering, k-means algorithm, Regression- Linear, Logistic, Support Vector Machines, Classification- Decision Tree classification, Attribute selection, Naïve Bayes Classification.

Text Books:

1. G. Sudha Sadasivam, R. Thirumahal, "Big Data Analytics", Oxford University Press.

Reference Books:

1. Paul Zikopoulos, Chris Eaton, "Understanding Big Data Analytics for EnterpriseClass Hadoop and Streaming Data", 1st edition, TMH.

CO-PO Mapping:

(**1: Slight [Low];**   **2: Moderate[Medium];**   **3: Substantial[High],**   **'-' : No Correlation)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print			
S.No.	UNIT	Essay 10 M	Weightage
1	I	3	37.5
2	II	3	37.5
3	III	2	25

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc.   Semester-III

Data Analytics

MODEL QUESTION PAPER (W.E.F 2023-2024)

Time: 2 ½ Hrs.   Max Marks: 50

SECTION - I

Answer any 5 questions   **5 X 3= 15M**

1. **Q1**
2. **Q2**
3. **Q3**
4. **Q4**
5. **Q5**
6. **Q6**
7. **Q7**
8. **Q8**

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Course Code	Title of the Course	L	T	P	C
325706	**Cyber Security**	2			2
Prerequisites					

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Develop an understanding of cybercrimes and various legal perspectives involved.
CO2	Develop a security model to handle mobile, wireless devices and related security issues ofan organization.
CO3	Use the cybercrime tools and methods in solving real world problems

Syllabus:

UNIT –I

Introduction to Cybercrime: Introduction, Cybercrime: Definition and origins of the word, Cybercrime and Information Security, who are cyber criminals? classifications of cybercrimes, cybercrime: the legal perspectives, an Indian perspective, cybercrime and the Indian IT Act 2000, a Global perspective on Cybercrimes.

UNIT –II

Cybercrime-Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Authentication Service Security, Attacks on Mobile/Cell Phones.

Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile Devices-Related Security Issues, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT –III

Tools and Methods Used in Cybercrime: Password Cracking, key loggers and Spywares, virus

and worms, Trojan Horses and Backdoors, Steganography, attacks on wireless networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

Text Books:

1. Mark Rhodes, Ousley, Information Security, 1st Edition ,MGH, 2013.

2. Nina Godbole and SunitBelpure ⁻ Cyber Security Understanding Cyber Crimes,Computer Forensics and Legal Perspectives , 1st Edition Publication Wiley, 2011.

Reference Books:

1. Information Security Management Principles (2e) By David Alexander, Amanda Finch, David Sutton, Andy Taylor

CO-PO Mapping:

(1: Slight [Low];   2: Moderate[Medium];   3: Substantial[High],   '-' : No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1														
CO2														
CO3														
CO4														
CO5														

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT	Short 3 M	Essay 7 M	Weightage
1	I	2	2	
2	II	2	2	
3	III	2	2	

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

II B.Sc.   Semester-IV

Cyber Security

MODEL QUESTION PAPER (W.E.F 2023-2024)

Time: 2 ½ Hrs.   Max Marks: 50

SECTION - I

Answer any 5 questions   **5 X 3= 15M**

1. **Q1**
2. **Q2**
3. **Q3**
4. **Q4**
5. **Q5**
6. **Q6**
7. **Q7**
8. **Q8**

CERTIFICATE COURSE

Course Code	Title of the Course	60 hours
	Data Analysis using Excel	
Prerequisites		

Course Objective

1. To help the students to understand the features of Excel and analyses data using Excel.

SYLLABUS

UNIT I

About Excel & Microsoft, Uses of Excel, Excel software, Spreadsheet window pane, Title Bar, Menu Bar, Standard Toolbar, Formatting Toolbar, the Ribbon, File Tab and Backstage View, Formula Bar, Workbook Window, Status Bar, Task Pane, Workbook & sheets.

Selecting Columns & Rows, Changing Column Width & Row Height, Autofitting Columns & Rows, Hiding/Unhiding Columns & Rows, Inserting & Deleting Columns & Rows, Cell, Address of a cell, Components of a cell – Format, value, formula, Use of paste and paste special

UNIT II

Excel sharts Charts: Creating Charts, Different types of chart, Formatting Chart Objects, Changing the Chart Type, Showing and Hiding the Legend, Showing and Hiding the Data Table Data Analysis : Sorting, Filter, Text to Column

Data Validation PivotTables: Creating PivotTables, Manipulating a PivotTable, Using the PivotTable Toolbar, Changing Data Field, Properties, Displaying a PivotChart, Setting PivotTable Options, Adding Subtotals to PivotTables.

UNIT III

Excel Tools: Moving between sheets, Selecting Multiple sheets, Inserting and Deleting sheets Renaming sheets, Splitting the Screen, Freezing Panes, Copying and Pasting Data between Spreadsheets, Hiding, Protecting worksheets Making Macros: Recording Macros, Running Macros, Deleting Macros

Text Book(s)

1. Excel Data Analysis For Dummies (For Dummies (Computer/Tech)) 4th Edition
   By Paul McFedries

2. Microsoft Excel Data Analysis and Business Modeling (Business Skills) 5th Edition
   by Wayne Winston (Author)

Reference Book(s)

3. Marketing Analytics: Data-Driven Techniques with Microsoft Excel 1st Edition
   by Wayne L. Winston (Author)

Assessment Scheme

Internal Assessment	50 Marks
External Exam	50 Marks

Internal Exam Scheme

Practical Assessment	30 Marks
Record	10 Marks
Viva-Voce	10 Marks

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GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

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DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Data Analysis using Excel
MODEL QUESTION PAPER (W.E.F 2024-2025)

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

Answer any FIVE questions: **5 x 10 = 50M**

1. Explain the essential components of the Excel interface and their functions.

2. Describe in detail the various methods for selecting, manipulating, and managing columns and rows in Excel.

3. Discuss the importance of data visualization through charts in Excel. Compare and contrast different types of charts available in Excel

4. Explain standard tool bar in Excel.

5. Explain about sorting and filtering in Excel.

6. Explore the creation and manipulation of PivotTables in Excel.

7. Analyze the role of data validation in maintaining data integrity in Excel.

8. Explain formatting tool bar excel.

9. Explain managing sheets in excel.

10. Explain macros in Excel.

Tentative Topics for Community Survey Project

1. Digital Literacy and Access to Technology in the Local Community

2. Usage and Perception of E-Government Services among Residents

3. Cyber security Awareness and Practices in the Community

4. Impact of Social Media on Community Engagement and Communication

5. E-commerce Adoption and Online Shopping Behaviour in the Local Area

6. Awareness of Data Privacy and Protection Among Community Members

7. Smartphone Usage Patterns and App Preferences in the Neighbourhood

8. Community Perspectives on AI and Automation in Everyday Life

9. Online Learning and Education Technology Adoption in the Local Community

10. Health and Fitness App Usage and Its Impact on Lifestyle

11. Sustainability Practices and Awareness within the Community

12. Local Community's Views on Digital Entertainment and Streaming Services

13. Perception and Attitudes towards Online Privacy and Data Collection

14. Community's Knowledge and Perception of Cloud Computing Services

15. Social Impact of Ride-Sharing and Food Delivery Apps in the Neighbourhood

16. Digital Payment Adoption and Usage Trends among Residents

17. Community's Readiness for 5G Technology and Its Potential Benefits

18. Digital Inclusion and Challenges Faced by Vulnerable Community Members

19. Local Businesses' Utilization of E-commerce Platforms and Strategies

20. Community Engagement with Open-Source Software and Contributions