P.R. GOVT. COLLEGE (A)

KAKINADA

Affiliated to Adikavi Nannaya University

Rajamahendravaram

DEPARTMENT OFCOMPUTER SCIENCE

CBCS(CLUSTER PATTERN)

BOARD OF STUDIES

2024-2025

DEPARTMENT OF COLLEGIATE EDUCATION
GOVERNMENT OF ANDHRA PRADESH

PROCEEDINGS OF THE PRINCIPAL, PITHAPUR RAJAH's GOVT. COLLEGE [A] :: KAKINADA
Present: Dr. B.V. TIRUPANYAM, Ph.D.

Rc.No.2/A.C/BOS/2024-25 Dt.23 Apr 2024

Sub: P.R.G.C[A] – Academic Cell - **Conduct of BOS Meetings for the Academic Year 2024-25** – Guidelines issued - Regarding.

The Autonomous colleges are, as per its vision, mission, stated objectives and core values, mandatedto design and develop their own outcome -based curricula keeping in view the societal, local and global industry requirements, employability and industry – ready and transferable skills duly prescribing Course Outcomes (COs), Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) and suitable learning outcome assessment management system through robust and transparent evaluation system to measure their attainment levels by the students.

The Sustained Developmental Goals (SDG-4) of UNEP recommended assurance of quality to students in HEIs promoting creativity, critical thinking and collaborative skills, while building curiosity, courage, resilience and gender equality among students.

Further, the NEP-2020 recommended that the HEIs shall embark upon rolling out 21st century students capable of facing challenges, adaptive to changes, creative and innovative, well rounded students equipped with inventive and creative skills, out-of-box thinking skills, problem solving skills, employability skills,etc., that translate them into leaders and potential entrepreneurs. Hence, the policy recommended internships/ apprenticeships embedded programs. Further, the policy laid much emphasis on rolling out environmentally conscious, value driven, constitution-respecting and socially responsible citizens too.

The HEIs are also, as per the Revised Accreditation Framework [RAF] of NAAC, endowed with the responsibility of rolling out quality and holistic human resources to the modern Indian Economy by ingraining quality in teaching- learning process, integrating IT into teaching-learning and help students experience and prescribed a wide range of participative and experiential learning experiences including field trips, conferences, integration of technology, community service programmes, career guidance, certificate and value added courses, research and inquisition based teaching, exchange programmes, gender equity programmes, collaborations, consultancies, community outreach strategies and encouraged HEIs to be distinctive and unique in practices.

Besides, the students shall have social consciousness, regard for constitutional provisions, right perspective on environmental protection, awareness on gender equity, health and hygiene, Yoga and wellness, college social responsibility, culture and values, etc., to mention a few.

Further, the Ministry of India, GoI, through NIRF, prescribes quality research, infrastructure augmentation, enhanced placement and progression to higher education, equipment of employability skills leading to enhanced public perception about the college among the public.

Further, the A.P State Council of Higher Education, in the Post Graduation eco-system has come out with a revised curricular frame work from the Academic Year 2024-25 incorporating Skill Enhancement Courses, Open Online Courses, Indian Knowledge System, projects works in VI semester, besides new credit structure (APSCHE's curricular frame enclosed).

Our institution has, from AY 2022-23, has devised its new vision and mission along with objectives and core values necessitating design and re-orientation of its academic administration in

tune with them.

ORDER:

In the light of the above mandate and responsibilities prescribed by institution's vision and mission, SDG-4, NEP – 2020, NAAC, NIRF to the autonomous HEIs, to meet the expectations of industries, students, Government and in tune with the APSCHE's revised and new P.G Curricular framework we need to customize, design and re-orient our academic and research administration.

Hence, the Chairmen of U.G and P.G Boards of Studies of various Departments are requested to make necessary arrangements for the conduct of the meetings in the Third week of April 2024. They are further requested to prepare curricula and extracurricular activities and devise suitable evaluation system keeping in mind above recommendations to make students a wholesome personality.

Further, the Chairman of the each BOS, in association with the IQAC coordinator, preceding the BOS meeting, is requested to prescribe benchmarking, quality initiatives in pedagogy and learning; in design of curriculum (with 20% change) and optimum utilization of existing human, physical and ICT resources and adopt resolutions to the extent of benchmarks (As per SOP given in **Annexure – I)**. Further, as the regular attendance of students to the classes is a deciding factor in enhancement of quality in learning, a minimum attendance of 75% for I & II mid-term examinations under CIA component shall be the benchmark for attendance and it shall be approved in the BOS. The Chairmen are also requested to approve the new programmes to be introduced for 2024-25, if any, number of certificate courses, their frequency, Bloom 's- Taxonomy based evaluation system for effective learning outcomes as per the Annexure – I.

Pre-BoS activity:

1. The Chairmen shall send the curricula designed for AY 2023-24 to the Industrialists, Alumni, parents and senior subject experts and get feed back and input on the quality of the syllabi, extra-curricular activities, student-centric activities by 6 April 2024.
2. The Chairmen are, therefore, requested to

- Design curricula of Odd and even semesters for the A.Y 2024-25 both for U.G (I to VIII semesters)and P.G(I to IV Semesters) courses in tune with the stated vision, mission of the institution, RAF of NAAC, NEP-2020 and NIRF.
- It is mandatory to change the syllabus every year for a maximum of 20% .
- Conduct meeting with employers, parents, alumni, shall take feedback on the existing curricula and invite suggestions and changes to be made.
- Invite the University nominee, subject experts, industrial nominees, student nominees, parents well in advance along with the date, venue, agenda, etc. A soft copy shall be communicated well in advance to the members to have an idea on the matters.
- **The Subject experts should be preferably a Doctorate with more than 10 years of teaching experience. He should have experience in designing industry related, market and job oriented curriculum.**
- Facilitate much room for intense deliberation on the design of the curricula, evaluation system, research component, enhancing learning experiences, resource utilization by staff and students, etc.,
- Each Department shall approve and recommend additional credits for additional modules, training programmes, N.S.S, N.C.C, participation in cultural programs, sports and games, environmental programs, blood donations camps, etc.
- All meetings shall be offline. Online attendance of members faculty will be permitted only in exceptional cases.
- The Chairmen shall submit minutes of the meeting in the prescribed format only (Annexure – II) in triplicate (hard copies) to the Academic cell for onward submission to the IQAC, Examination cell and library within three days from the completion of BOS meeting and besides hosting the soft copy in the

college website within the period stipulated.

- Each Chairman of BOS, shall get the rough draft of the curricula verified and approved by the Principal, Academic Cell and IQAC before the actual BOS meetings to ensure uniformity and commensurate with the stated vision and mission of the college among the departments.
- The Academic Cell coordinator shall be the Chief Coordinator for the BOS meeting activity and IQAC coordinator will be the additional coordinator.
- The Academic Coordinator and IQAC coordinators will conduct a meeting with the Chairmen, BOS on 25 April 2024 and explain the structure of curricula, uniformity other modalities.
- The Controller of Examinations of the institution shall fund the BOS meetings from the available funds on the condition of reimbursement after receiving autonomous funds from UGC. Initially, he shall pay Rs. 5,000/- uniformly as an advance to each Chairman towards each course (If BOS meetings for multiple courses are held under one Chairmanship, he/ she shall be given advance amount equivalent to the number of courses x Rs.5000/-)
- The Chairman of each BOS shall apply to the principal for advance amount for meeting the BOS meetings with head-wise expenditure in the prescribed format (Annexure-III).

The chairmen of BOS are instructed to take suggestions from Industrialist (Part of Pre BOS)who is not in the previous BOS as member from industrialist category regarding the change in syllabus for the papers in BOS 2023-24 and proposal for new courses for the Academic year 2024-25 keeping in view of the future job opportunities .

S.No	Title of the Paper	Feedback or suggestions on the curriculum designed during 2023-24 BoS(Whether industry oriented/ relevant for equipping skills for 21st century students)	Proposal of New Courses for 2024-25	Justification

Following contents shall be presented in the BOS document in order

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

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

6. Resolutions adopted in the meeting with detailed discussion that took place during the meeting (Activities and Bench marking as per Annexure –I)
7. At the end of each theory paper, each topic shall be mapped as per the Blooms taxonomy and scope of that topic for skill/ employability/ entrepreneurship opportunities in the following table incorporated

S. No	Subject	Semester	Title of the Course (Paper)	Topic	Parameter as per Blooms taxonomy (Knowledge/ Application/ Creativity/ Innovation	Experiential learning component	Scope (Skill/ employability/ entrepreneurship)
1	III	Botany	Plant Physiology	Plant Cell	Knowledge	Shall be shown Microscope	
2	III	History	Tourism	Tourism management	Application	Apprenticeship	Employability

8. Each BOS Chairman shall, immediately after syllabus, tabulate the changes made in the syllabus/ paper along with justification, in the Proforma given in Annexure – I.
9. Attendance of Members present with signatures in the tabular form.
10. List of Examiners & Paper setters (Minimum 20 members list)
11. Syllabus for each course (both theory & Practical in case of Science subjects) followed by model question papers (theory & practical) and allocation of CIA (50marks) for each course with structure.
12. Each student (2024-25 AB) has to complete one MOOCS course from SWAYAM in any subject per year which is mandatory.

CIA structure for Single Major system

- Out of 50 marks for CIA, 25 marks are allocated for Mid examinations. In each semester two mid examinations to be conducted and the average of the two will be considered.
- I mid examination is to be conducted in offline mode at college level and II mid examination is to be conducted in online mode at department level.
- I mid examination to be conducted in offline mode in which the student should attempt **one essay** question for ten marks out of two questions, **two short** answer questions with five marks each out of four questions and five objective questions to be given for each paper.
- Question paper is to be given as per the following structure for the courses with **4 units**

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

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

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

- The remaining 25 marks for CIA are allocated as per the following structure.

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

CIA structure for 3 Major system

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

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

CIA structure for 3 Major system for Honors programmes(2020-21AB)

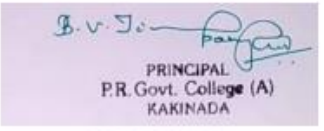
- Out of 40 marks for CIA, 20 marks are allocated for Mid examinations. In each semester two mid examinations to be conducted and the average of the two will be considered.
- I mid examination is to be conducted in offline mode at college level and II mid examination is to be conducted in online mode at department level.
- I mid examination to be conducted in offline mode in which the student should attempt **Two essay** questions for ten marks each out of three questions, **four short** answer questions with five marks each out of six questions.
- The remaining 20 marks for CIA are allocated as per the following structure.

Assignment- 10M	Seminar- 5M	Quiz -5M

13. Percentage of syllabus changes in each paper
14. Measure outcome attainment learning levels of students through direct and indirect methodology and mapping COs and POs
15. Text & Reference Books
16. e-content links.

The BoS meetings should be conducted as per the scheduled timelines given below.

S.No	Activity	Scheduled Date
1	Issuing notification for conduct of BoS meetings	23.04.2024
2	Pre BOS (Offline/Online)	25.04.2024
3	Departmental level curricula design	27.04.2024
4	Finalization of draft BOS	27-04-2024
5	Scrutiny by academic cell	29-04-2024
6	Correspondence with Subject experts, University nominees, Industrialists	28-04-2024
7	BOS for UG & PG	30-04-2024



PRINCIPAL
Pithapur Rajah's **Government Autonomous College**
Kakinada

Enclosures: Annexures- I, II & III
Copy to:

Lecturers-in-Charge (BOS Chairmen) of all the departments
Academic Coordinator
IQAC coordinator
Controller of Examinations
Office

Vision and Mission of the college

Vision:

To provide the right academic environment paving way for intellectual excellence, humane feelings and social commitment. The college believes in providing quality education for the socially disadvantaged, economically weaker sections of the society and thereby help them move up the ladder of success and social order.

Mission:

- To impart holistic education with special emphasis on character, culture, updated knowledge and skill-oriented learning.
- To make the students enjoy the fruits of globalization without prejudice to their local and cultural environment.
- To impart necessary life skills so as to make them face any challenge in the bigger world – Social, ethical, psychological or professional.

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

BOARD OF STUDIES 2024-25

The Twentieth meeting of Board of Studies ***COMPUTER SCIENCE*** has been conducted in the Department of Computer Science on 30 APR, 2024 to discuss the following.

AGENDA

1. Department activities for 2024-25 academic year.
2. Organizing National/State level Seminars / Workshops / Conferences / /Training programmes etc., with topics and other details
3. Plan for organizing subject oriented community outreach programmes & allocation of necessary funds.
4. Any other programme that enhances the learning capacity of students and their employable & knowledge skills.
5. Suggest panel of examiners / paper setters & other experts / nominees for BOS deliberations.
6. Pedagogy implementation w.e.f. admitted batch 2024-25
7. Internal Assessment weight age 50% for I Year ,II Year and III Year students
8. End Semester Examinations for 50 marks for I Year, II Year and III year students.
9. Conduct practical examination semester wise for three years.
10. Encourage students to take-up certificate courses from AWS
11. IOT syllabus for I , II and III year students may be followed as framed by CCE AP
12. Any other issues with the permission of chair

RESOLUTIONS

The nineteenth meeting of Board of Studies ***COMPUTER SCIENCE*** has been conducted in the Department of Computer Science on 30th APR 2024 and adopted the following resolutions.

1. Program Specific Outcomes of Artificial Intelligence and IoT programmes discussed and approved.
2. Course Outcomes of Artificial Intelligence and IoT programme courses discussed and approved
3. Resolved to approve the curriculum, and academic activities of Artificial Intelligence and IoT programme for the academic year 2024-25.
4. Approved Blue Prints, Model Question Papers, and Question Banks for all UG Programs (I, II and III Years) in alignment with Bloom's Taxonomy
5. Approved Scheme of Evaluation for Internal and External Evaluation for I, II and III Years (50:50 pattern)
6. Resolved to approve Revised Panel of Question Paper Setters and Examiners
7. Resolved to approve department action plan-2024-25
8. The syllabus of new certificate course on Amazon web services discussed and approved
9. Approved the inclusion of additional inputs as necessary to each course for further extension of student knowledge
10. The resolution and approval have been made to divide the students of the department, with half undertaking apprenticeships during the V semester and the other half during the 6th semester.

DEPARTMENT OF COMPUTER SCIENCE

CONSOLIDATED REPORT OF BOARD OF STUDIES FOR THE YEAR 2024-2025

The board of studies meeting of computer science department was conducted on **30 April 2024** under the chairmanship of R.V .Satyanarayana Lecturer in –in-charge of Department of computer science the following members are present and approved the above resolutions

S.No	Name with Designation and Address	Designation	Signature
1	Sri. R.V.Satyanarayana In-Charge, Dept. of Computer Science P. R. Govt. College (A), Kakinada	Chair Person	30/04/2024
2	Smt. N. Nagasubramanyeswari Lecturer in Computer Science A.S .D.Govt degree college for women (A) , Kakinada	University Nominee	N.N.S. Eswari 30/04/2024
3	Sri .Dr. N Sridhar Lecturer in Computer Science Government Degree College, Tuni	Subject expert	30/04/2024
4	Sri. D. Suneel kumar Lecturer in Computer Science Govt. Degree College (A),Rajamhaendravaram	Subject expert	
5	Sri. P. S. R. Subrahmanyam, Rtd. HOD of Mathematics, Ideal College of Arts & Science (A), Kakinada	Alumni Member	
6	Sri A Sivakumar Developer TCS,Hyderabad	Industry Expert	
7	Miss. G Aneetha Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	
8	Sri Anantha teja Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	
9	Miss .K.Manisha Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	
10	Sri. P.Susmitha Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	P.Susmitha

11	N.Durga bhavani	Parent Member	Durga Bhavani
12	B.Sai yaswanth	Student Member II B.SC-M.S.C.S	B.S Yaswanth
13	P.Lalitha kumari	Student Member II B.sc –M.S.C.S	P.Lalitha kumari
14	A.Syamala	Student Member II B.Sc –M.C.Cs	
15	D.Dhana Lakshmi	Student Member II B.sc –M.EIOT	D. Dhanalakshmi
16	T. Satish	Student Member II B.sc-M.E.C.S	T. Satish
17	R.N.Sivani	Student Member II B.Sc MPCS	R.N-Sivani
18	K. Chakravani	Student Member II B.sc AI	Chakravani
19	Aswitha lakshmi	Student Member I Bsc IOT	A. Aswitha Lakshmi

PANEL OF NAMES FOR APPOINTMENT OF EXAMINERS/PAPERSETTERS 2023-24

S.NO	NAME OF THE LECTURER	NAME OF THE COLLEGE
1	Dr. N Sridhar	GDC Tuni
2	Smt. Naga Subramanyeswari	ASD Women's College ,Kakinada
3	Sri. D.Suneel	G.D.C.(A), Rajamahendravaram
4	Sri RASMI RANJAN KHANSAMA	GDC TUNI
5	Dr. Ch. V. M. Hari	Dr VS Krishna G.D.C.(A), Visakhapatnnam
6	Sri. D. V. Raghava Swamy	Dr VS Krishna G.D.C.(A), Visakhapatnnam
7	Sri. BODALA RAVI	GDC Tuni
8	Sri. R Ashok Kumar	SCIM Govt. College, Tanuku
9	Sri. SSVAS Samba Murthy	GDC, Paderu
10	Dr. Jahnavi	VS Krishna College, VIsakhapatnam
11	Sri. E Jyothi Kiranmai	SCIM Govt. College, Tanuku
12	Sri. D Vijay Kumar	SCIM Govt. College, Tanuku
13	Smt. U Sandhya Rani	GDC(A), Rajahmundry
14	Sri H Devaraj	GDC(A), Rajahmundry
15	Sri P Narasinga Rao	GDC(A), Rajahmundry
16	Sri D Seeta Ramudu	GDC(A), Rajahmundry

B.Sc. ARTIFICIAL INTELIGENCE

Courses for the Academic Year 2023-2024

B.Sc. PROGRAMME – COURSE STRUCTURE OF COMPUTER SCIENCE

UNDER CBCS PATTERN

S.No.	Semester	Course Code	Title of the Course (Paper)	Hrs./ Week	Max Marks (SEE)	Marks in CIA	Total	Credits
1	SEM - I	1	Essentials and Applications of Mathematical, Physical and Chemical Sciences	4	50	50	100	3
		2	Advances in Mathematical, Physical and Chemical Sciences	2	50	--	50	2
2	SEM - II	3	Python for Data Science	4	50	50	100	3
			Python for Data Science Lab	2	50	--	50	1
		4	Statistical Methods and Probability Distribution	4	50	50	100	3
			Statistical Data Analysis Using SPSS-I Lab	2	50	--	50	1
	Life Skill Course		Digital Literacy	2	50	--	50	2
3			Phase – I CSP		100			4
4	SEM-III	**5**	Document Oriented Database	3	50	50	100	3
			Document Oriented Database Lab	2	50	--	50	2
		6	Operating Systems	3	50	50	100	3
			Operating Systems Lab	2	50	--	50	2
		7	Data Structures Using 'C'	3	50	50	100	3
			Data Structures Using 'C' Lab	2	50	--	50	2
		8	Inferential Statistics	3	50	50	100	3
			Statistical Data Analysis Using SPSS - II Lab	2	50	--	50	2
5	SEM IV	9	Data Warehousing and Data Mining	3	50	50	100	3
			Data Warehousing and Data Mining Lab	2	50	--	50	2
		10	Machine Learning using Python	3	50	50	100	3
			Machine Learning using Python Lab	2	50	--	50	2
		11	Introduction to AI	3	50	50	100	3
			Introduction to AI Lab	2	50	--	50	2

B.Sc. Computer Science

Courses for the Academic Year 2022-2023 and Before batches

B.Sc. PROGRAMME – COURSE STRUCTURE OF COMPUTER SCIENCE

UNDER CBCS PATTERN

6	SEM-V	6A	Web Interface Designing Technologies	4	50	50	100	3
			Web Interface Designing lab	2	50	--	50	2
		7A	Web Application using PHP and MYSQL	4	50	50	100	3
			Web Application using PHP and MYSQL lab	2	50	--	50	2
		6B	Internet of things	4	50	50	100	3
			Internet Of Things lab	2	50	--	50	2
		7B	Application Development using python	4	50	50	100	3
			Application Development using python lab	2	50	--	50	2
		6C	Data Science	4	50	50	100	3
			Data Science lab	2	50	--	50	2
		7C	Python for data science	4	50	50	100	3
			Python for data science Lab	2	50	--	50	2
7	SEM VI		Phase III Apprenticeship (6 months)		150	50	200	12
8	SEM I	Life skills 1	Basics of Computer Applications	2	50		50	2
9	SEM II	Life Skills 2	ICT	2	50		50	2

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

BOARD OF STUDIES 2023-2024& 2022-23

Marks Distribution for the I Year, II Year & III year

Internal: 50 marks External: 50 marks

S.No.	Activities	Marks Allotted
1	Two Internal Mid Term Exams (Avg of two).. for 25marks	25 Marks
2	Project(10M), Viva voce(3M), Assignments(5M), seminars(5M),clean & green and attendance-(2M)	25 Marks
		Total - 50 Marks

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

B.SC PROGRAMME COURSE STRUCTURE IN COMPUTER SCIENCE 2024-25

SUMMARY OF CHANGES IN SYLLBUS

Semester	Title of the Course(Paper)	Changes
I	Essential and Applications of Mathematical, Physical and chemical sciences	NIL
I	Advances in Mathematical,Physical and chemical sciences	NIL
II	Python for Data sciences	NIL
II	Fundamentals of Computers and C programming	NIL
II	Fundamentals of IoT and Applications	NIL
III	Document Oriented database	NIL
III	Operating System	Unix added in unit 4, Shell programming added in unit 5
III	Data Structures using C	arrays removed because it is already covered in C. Applications of linked list added. Balanced Binary Trees added. Dijkstra's shortest path, Transitive closure, Warshall's Algorithm added
III	Object Oriented programming using Java	GUI programming added
III	Python for Data sciences	NIL
III	Data Communications and Computer networks	NIL
III	Data Structures using 'C'	arrays removed because it is already covered in C. Applications of linked list added. Balanced Binary Trees added. Dijkstra's shortest path, Transitive closure, Warshall's Algorithm added
III	Digital Logic Design	New Course
IV	Data warehousing and data mining	New Course
IV	Machine Learning using Python	New Course

IV	Introduction to AI	New Course
IV	Java Programming	New Course
IV	Operating Systems	Unix added in unit 4, Shell programming added in unit 5
IV	Computer Organization & Architecture	New Course
V	Web Interface Designing Technology	NIL
V	Web Application Development using Php & MySql	NIL
V	Java Programming for IoT	NIL
V	Big data Analytics	NIL

B.Sc. (Hons.)Artificial Intelligence

Program Specific Outcomes (PSOs)

After completion of the program, the student is able to

PSO1: AI Problem Solving Proficiency: Demonstrate proficiency in analyzing intricate problems, identifying AI-based solutions, and developing algorithms using machine learning and AI techniques.

PSO2: Advanced AI Modeling and Implementation: Excel in designing AI models, implementing machine learning algorithms, and deploying AI solutions for real-world applications.

PSO3: Expertise in Natural Language Processing and Computer Vision: Apply their expertise in natural language processing and computer vision to analyze text and images, and innovate AI-driven solutions in these specialized domains.

PSO4: Ethical AI and Human-AI Interaction: Critically evaluate AI systems for ethical implications, ensuring responsible development, and collaborate in designing AI systems that seamlessly interact with humans.

B.Sc (Honours) with Single Major

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

SEMESTER-I

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester I B.Sc. AI (I Sem.)			
Course Code	**TITLE OF THE COURSE** Essentials And Applications of Mathematical, Physical and chemical Sciences				
Teaching	Hours Allocated:60(Theory)	L	T	P	C
Pre-requisites:		5		-	4

Course Objectives

1. The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. 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 in various 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 security concepts, including threats, vulnerabilities, and counter measures.

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

UNIT–II

ESSENTIALS OF PHYSICS:

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

UNIT–III

ESSENTIALS OF CHEMISTRY:

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

UNIT–IV

APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY:

Applications of Mathematics in Physics & Chemistry: Calculus, Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Auto motive and Aerospace Industries ,Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT–V

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

Text Books:

1. Functions of one complex variable by John. B. Conway, Springer-Verlag.
2. Elementary Trigonometry by H.S .Hall and S.R. Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd. 4.Basic Statistics by B.L .Agarwal, Newage international Publishers
4. Essentials And Applications Of Mathematical, Physical and chemical Sciences: HK Dass, PS Hemne, RL Madan, Rama Verma, Rajnish Verma, Suneel K Duvvuri.
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. JewettJr.
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 ,RyanOlson

WebLinks:

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

CO-POMapping:

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

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

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT	Short 5 M	Essay 10M	Weightage
1	I	2	2	30%
2	II	2	1	20%
3	III	1	1	15%
4	IV	1	1	15%
5	V	1	1	15%
		35	60	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
SEMESTER – I

Time: 2 Hours **Max Marks: 50M**

Section -I

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

Part – A

1. Long Answer Question 1
2. Long Answer Question 2
3. Long Answer Question 3

Part - B

4. Long Answer Question 4
5. Long Answer Question 5
6. Long Answer Question 6

Section II

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

7. Short Answer Question 7
8. Short Answer Question 8
9. Short Answer Question 9
10. Short Answer Question 10
11. Short Answer Question 11
12. Short Answer Question 12
13. Short Answer Question 13

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester I B.Sc. AI(I Sem)			
Course Code	**TITLE OF THE COURSE Advances In Mathematical, Physical and Chemical Sciences**				
Teaching	HoursAllocated:60(Theory)	L	T	P	C
Pre-requisites:		5		-	4

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. 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.

Syllabus

UNIT–I

Straight Lines: Different forms – Reduction of general equation into various forms –Point of inter section of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule

Integration: Integration as are verse process of differentiation–Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices –Transpose of a matrix and determinants

UNIT–II

Renewable energy: Generation, energy storage, and energy-efficient materials and devices.

Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication-recent advances in biophysics-recent advances in medical physics-Shape Memory Materials.

UNIT–III

ADVANCESINCHEMISTRY:

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

UNIT–IV

ADVANCEDAPPLICATIONSOFMATHEMATICS,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.

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.

Text Books:

1. Coordinate Geometry by S.L.Lony ,Arihant Publications
2. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
3. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
4. "Energy Storage: A Nontechnical Guide" by Richard Baxter
5. Advances of Mathematical, Physical and Chemical Sciences: HK Dass, PS Hemne, RL Madan, Rama Verma, Rajnish Verma, Suneel K Duvvuri.
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

WebLinks:

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

CO-POMapping:

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

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

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT	Short 5 M	Essay 10M	Weightage
1	I	2	2	30%
2	II	2	1	20%
3	III	1	1	15%
4	IV	1	1	15%
5	V	1	1	15%
		35	60	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
SEMESTER – I

Time: 2 Hours **Max Marks: 50M**

Section -I

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

Part – A

1. Long Answer Question 1
2. Long Answer Question 2
3. Long Answer Question 3

Part - B

4. Long Answer Question 4
5. Long Answer Question 5
6. Long Answer Question 6

Section II

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

7. Short Answer Question 7
8. Short Answer Question 8
9. Short Answer Question 9
10. Short Answer Question 10
11. Short Answer Question 11
12. Short Answer Question 12
13. Short Answer Question 13

Semester-II

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester I B.Sc. AI Major- (II Sem.)			
Course Code	**TITLEOFTHECOURSE** PYTHON FOR DATA SCIENCE				
Teaching	Hours Allocated:45(Theory)	L	T	P	C
Pre-requisites:	Understanding basic computer concepts	3		-	3

Course Objectives:

1. The objective of this course is to study main elements of python programming and perform data analysis using data structures and tools in python.

Course Outcomes:

On Completion of this course, the students will be able to-	
CO1	To Understand Features and basic concepts of python.
CO2	To learn control structures in python and apply them to real world problems.
CO3	To implement functions and modules in python.
CO4	To understand data structures in python oops concepts
CO5	To construct data and perform data analysis.

Syllabus

UNIT-I

Basics of Python

Features of python, literal constants-numbers, variables, identifiers, data types, input operation, comments, operators, operations on strings, other data types, type conversion. Selection or conditional branching statements-if, if else, nested if, if elif else, loops or iterative statements- while, for, nested loops, break, continue, pass, else statement with loops.

UNIT-II

Functions and Modules

Functions-Definition and call, return statements, anonymous function-LAMBDA, recursive functions. **Modules-** Using existing modules, making own modules, packages in python, Names of standard library modules.

UNIT-3

Data Structures

List-Accessing lists, updating lists, nested lists, basic list operations, list methods, loops in lists.

Tuples -Creation, Accessing, updating, deletion in tuples and basic tuple operations.

Sets- creation, set operations.

Dictionaries-creation, accessing, adding and modifying items , deleting items.

UNIT-4

Object Oriented Programming concepts:

Oops concept-

Introduction, Classes and Objects, Class method Inheritance Introduction Inheriting classes in python Types of Inheritance, Error and Exception Handling

UNIT-5

Data Analysis:

Data preparation using pandas and series: pandas data frame basics**,** Creating your own data, Series, Data frames, Making changes to series and data frames

Plotting: Matplotlib Introduction, Univariate plots-Histograms

Textbooks:

1. **PythonProgrammingUsingProblemSolvingApproach**–ReemaTharej'aOxfordUniversityPress,©2017
2. **Pandas for Everyone(Python data Analysis)-** Daniel Y.Chen, Pearson Addison Wesley Data and Analyticsseries,©2018

Referencebooks:

1. **Python Programming Using Problem Solving Approach**–Reema Thareja, Oxford University Press, ©2017
2. **Pandas for Everyone (Python data Analysis)-**Daniel Y.Chen, Pearson Addison Wesley Data and Analytics series,©2018

WebLinks:

1. https://onlinecourses.nptel.ac.in/noc20_cs83/preview

CO-POMapping:

(1: Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':NoCorrelation)

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

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT	Short 5 M	Essay 10M	Weightage
1	I	2	2	30%
2	II	2	1	20%
3	III	1	1	15%
4	IV	1	1	15%
5	V	1	1	15%
		35	60	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
Program & Semester: I B.Sc. AI(II Sem.)
PYTHON FOR DATA SCIENCE Model paper
SEMESTER – II
Time: 2 Hours Max Marks: 50M

Section -I

Answer any three of the following questions. Must attempt atleast one question from each part.

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

Part – A

1. Demonstrate python loop/Iterative statements BT2

2. What is the lambda function? Write the characteristics of a lambda function. BT1

3. Explain the concept of classes and objects in Python. Provide an example demonstrating the creation of a class and instantiation of objects. BT1+BT2

Part - B

4. Describe the features of python. BT1

5. What is dictionary? Explain the methods available in dictionary. BT1

6. Explain how Data Frames organize data and facilitate operations such as filtering, aggregation, and visualization. BT1

Section II

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

7. Describe type conversion in python BT1

8. Demonstrate python data types BT2

9. Define function in python and state its advantages BT1

10. Design a program using functions to swap two numbers. BT3

11. Differentiate between list and tuple in python BT1

12. Demonstrate the role of constructors in Python classes. BT2

13. Explain the fundamental components and functionality of Pandas Data Frames. BT1

PYTHON FOR DATA SCIENCE LAB

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Implement a given problem as a python program.
CO2	To write loops and decision statements in Python
CO3	To implement functions and modules in Python.
CO4	To implement different data structures in python
CO5	To implement data analysis using pandas and graphs

Lab Experiments:

1. Write a program to read and print values of variables of different data types.
2. Write a program to find the roots of quadratic equations.
3. Write a program of in the largest of 3 numbers.
4. Write a program to check whether a given number is prime or not.
5. Write a program to generate Fibonacci series.
6. Write a program to find whether a given number is Armstrong or not.
7. Write a program using functions to swap two numbers.
8. Write a program to find factorial of a number using recursion.
9. Write a program to find square root of a given number using math module.
10. Write a program to generate 10 random numbers between 1to100 using random module.
11. Create a list and perform different operations on it.
12. Create a tuple and perform different operations on it.
13. Create a set and perform different operations on it.
14. Create a dictionary and perform different operations on it.
15. Import p and as and create a data frame and perform operations on it.
16. Generate histogram using Mat plot lib.
17. Generate scatter plot using Mat plot lib.
18. Generate box plot using Mat plot lib.

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	Pithapur Rajahs Government College(A) Kakinada	Program & Semester I B.Sc. AI (II Sem.)			
Course Code	**TITLE OF THE COURSE** **STATISTICAL METHODS AND PROBABILITY DISTRIBUTION**				
Teaching	HoursAllocated:45(Theory)	L	T	P	C
Pre-requisites:	Should have computer knowledge	3			3

Course Objectives:

The purpose is to familiarize the students about the basic concepts required for Artificial intelligence and Machine learning.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Know about correlation and regression techniques, the two very powerful tools in statistics,
CO2	Study concept of coefficient of determination and inference on partial and multiple correlation and regression coefficients.
CO3	Knowledge of important is create distributions such as Binomial, Poisson, Geometric, Negative Binomial and Hyper geometric and their inter relations ifany,
CO4	Knowledge of important continuous distributions such as Uniform, Normal, Exponential and Gamma and relation swith some other distributions,
CO5	Basic knowledge of complete enumeration and sample, sampling frame, sampling distribution,samplingandnon-samplingerrors,principalstepsinsamplesurveys,limitationsofsamplingetc.,

Syllabus

Unit I

Correlation Analysis

Meaning Measures of Correlation- Scatter diagram, Karl Pearson's and Spearman's rank correlation. Calculation of the correlation coefficient for bi-variety frequency distribution Multiple and Partial correlation (3 variables only)

Unit II

Curve fitting and Regression Analysis:

Principle of least squares, fitting of straight line, second degree polynomial or parabola, power and exponential curves**.**

Regression: Introduction, Linear Regression- Regression coefficients and its properties, Angle between two lines of regression. Standard error of estimate (residual variance), Explained and Unexplained variation, coefficient of determination. Multiple Linear Regression (3variablesonly)and Logistic Regression

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Unit III

Discrete Probability Distributions:

Uniform, Bernoulli, Binomial, Poisson, Geometric, Negative Binomial and Hyper-geometric distributions along with their characteristic properties, applications and limiting/approximation cases.

Unit IV

Continuous probability distributions:

Normal, Exponential, Uniform, Beta, Gamma, distributions along with their characteristic properties, applications and limiting/approximation cases.

UnitV

Basic concepts: population and sample, census and sample survey, sampling frame ,sampling distribution, standard error, sampling design, sampling and non-sampling errors, sample surveys, principles of sample survey, principal steps in sample survey, limitations of sampling, Sample survey versus complete enumeration survey. Types of sampling-Simpler and om sampling, stratified sampling, systematic sampling, and cluster sampling(only concept)

Reference books:

1. Fundamentals of Mathematical Statistics, 12th Edition, 10th September 2020,S.C.GuptaandV.K.Kapoor,SultanChand&Sons, New Delhi.
2. Fundamentals of Applied Statistics, 4th Edition 1stJanuary2014, (ISBN108180547051) S.C.Gupta and V.K.Kapoor,SultanChand&Sons,NewDelhi.
3. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris

P.Tsokos Academic Press (Elsevier),Haryana.

4. ProbabilityandStatistics,VolumeI,D.Biswas,NewcentralbookAgency(P)Ltd,NewDelhi AnoutlineofStatisticaltheory,VolumeTwo,3rdEdition,2010(withcorrections)
5. A.M.Goon, M.K.Gupta,B.Dasgupta,TheWorldPressPvt.Ltd.,Kolakota.
6. Sanjay Arora and BansiLal:.New Mathematical Statistics, Satya Prakashan, NewDelhi.

WebLinks:

1.**http://onlinestatbook.com/rvls/index.html**

CO-POMapping:

(1: Slight[Low];2:Moderate[Medium];3:Substantial[High],'-':NoCorrelation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
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	20.8%
2	II	2	2	20.8%
3	III	2	2	20.8%
4	IV	1	2	18.75%
5	V	1	2	18.75%
		35	60	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
SEMESTER – I

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

Section -I

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

Part – A

1. Long Answer Question 1
2. Long Answer Question 2
3. Long Answer Question 3

Part - B

4. Long Answer Question 4
5. Long Answer Question 5
6. Long Answer Question 6

Section II

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

7. Short Answer Question 7
8. Short Answer Question 8
9. Short Answer Question 9
10. Short Answer Question 10
11. Short Answer Question 11
12. Short Answer Question 12
13. Short Answer Question 13

	Pithapur Rajahs Government College(A) Kakinada	Program&Semester I B.Sc. AI(II Sem)			
Course Code	**TITLEOF THE COURSE STATISTICAL METHODS AND PROBABILITY DISTRIBUTION LAB**				
Teaching	HoursAllocated:30(Practical)	L	T	P	C
Pre-requisites:	Should have computer knowledge			2	1

Course Objectives

This course enables students to gain hands-on practical experience of SPSS for analyzing data.

CourseOutcomes:

On Completion of the course, the students will be able to-	
CO1	Apply the various statistical methods for real life problems
CO2	Analyze the uni- variate and bivariate data using statistical techniques.

Lab Experiments:

1. Diagrams & Graphs-Bar, Pie,Histogram,frequencypolygon,andOgivecurves
2. Computation of measures of centraltendency-ArithmeticMean,GeometricmeanandHarmonicMean–GroupedData.
3. Computationofmeasuresofcentraltendency-Median,ModeandPartitionValues-GroupedData.
4. Computation of measures of Dispersion – Quartile Deviation, Mean Deviation, Standard Deviation, Variance and Coefficient of Variation–Grouped Data.
5. Computation of non-central,centralmoments,$\beta_1$and$\beta_2$andSheppard'scorrectionsforgroupeddata.
6. Computation of Karl Pearson's coefficients, Bowley's coefficients of Skewness and coefficients of Skewness based on moments–GroupedData
7. Computationofcorrelationcoefficientandregressionlinesfor(i)ungroupeddata(ii)groupedbivariatedata
8. Construction regression line equations for (i) ungrouped data (ii) grouped bi-variate data.

Note: Training shall be in SPSS and derive the results. The SPSS output shall be exported to MSword for writing iference.

ReferenceManual: PracticalManual-PreparedbytheDepartmentFacultyMembers

Web sites of Interest:http://www.statsci.org/datasets.html

SEMESTER-II

DIGITAL LITERACY

Theory | Credits:2 | 2hrs./week

By undergoing the Digital Literacy course, one should acquire basic knowledge on Computer and he/she is able to

CO1: Perform operations on the computer

CO2: Access the Internet and finding in formation 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

Unit-1: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-2: 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-3: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

Prescribed readings:

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

Web Resources:

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**

Note: Digital Literacy course should be taught by blending the practical demonstration of concepts with hands-on experience by learners using desktop/laptop computer and mobile handset devices

SEMESTER-III

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester II B.Sc. AI Major- (III Sem.)			
Course Code	**TITLEOFTHECOURSE** Paper 5: DOCUMENT ORIENTED DATABASE				
Teaching	HoursAllocated:45(Theory)	L	T	P	C
Pre-requisites:	Understanding of basic computer concepts	3		-	3

Course Objective:

- To educate student regarding databases and how to manage databases.
- To handle the large amount of data handling demands of business
- To implement a data store that provides high performance, high availability, and automatic scaling
- To Process an immense diversity of data that needs to be stored and processed.
- To make use of features and functionalities to work on NO SQL Data Base Mongo DB

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:
CO1	Have knowledge about database and DBMS Architecture
CO2	Able to know No SQL databases, various features of Mongo DB, the installation procedure, and how to interact with MongoDB.
CO3	Able to work on Mongo DB's rich query language to support create, read, update, and delete (CRUD) operations.
CO4	Analyses the aggregation framework to perform aggregation operations.
CO5	Able to work on indexes, types of index, index properties, and the various indexing strategies to be considered. Indexes are used to improve the performance of a query.

UNIT –I

Overview of Database Management Systems:

Introduction, Data and Information, Characteristics of the Database Approach - Self-Describing Nature of the a Database System, Insulation between Programs and Data, Data Abstraction, Support of Multiple Views of the data, Sharing of Data and multiuser Transaction Processing, Actors on the Scene - Database Administrators, Database Designers, End Users , System Analysts and Application Programmers , Advantages of using a DBMS - Controlling Redundancy, Restricting unauthorized Access, Enforcing Integrity Constraints, Providing Backup and Recovery, Database System Concepts and Architecture, DBMS

Architecture and Data Independence - The Three-Schema Architecture , Data Independence , Database Languages and Interfaces.

UNIT – II

Mongo DB Features and Installation, The Need for No SQL Databases, What Are No SQL Databases? CAP Theorem, BASE Approach, Types of NoSQL Databases, MongoDB Features, Document Database

MongoDB Is Schemaless MongoDB Uses BSON, Rich Query Language, Terms Used in MongoDB, Data Types in MongoDB, Working with Database Commands, Create Database, Drop Database.

UNIT III

MongoDB CRUD Operations, Collections, Create a Collection, Create Capped Collections, Create Operations, Insert Documents, Read Operations, Query Documents, Update Operations, Update Documents, Delete Operations, Delete Documents, Working with Arrays.

UNIT IV

Data Modelling and Aggregation, Data Models, Embedded Data Models, Normalized Data Models Data Model Relationship Between Documents, Data Model Using an Embedded Document, Data Model Using Document References.

UNIT V

Indexes and Working with Indexes, Index Types, Index Properties, Indexing Strategies.

Text Book:

1. "Fundamentals of Database Systems" by R.Elmasri and S.Navathe
2. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S. Sudarshan,McGrawhill, 2010.
3. MongoDB Recipes: With Data Modeling and Query Building Strategies By Subhashini Chellappan, Dharanitharan Ganesan , Publisher : Apress

Reference Book:

1. "Database Management Systems" by Raghu Ramakrishnan, McGrawhill,2002
2. "Prinicples of Database Systems" by J.D.Ullman
3. MongoDB Basics 1st ed. Edition , by Peter Membrey (Author) Publisher: Apress

Web Links:

1. https://docs.mongodb.com/manual/tutorial/getting-started
2. https://www.tutorialspoint.com/mongodb/index.htm

Recommended Co – Curricular Activities:

A. Measurable

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

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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	Pithapur Rajahs Government College(A) Kakinada	Program & Semester I B.Sc. AI(I Sem.)			
Course Code	**TITLE OF THE COURSE** Paper 5: DOCUMENT ORIENTED DATABASE Lab				
Teaching	HoursAllocated:30(Theory)	L	T	P	C
Pre-requisites:		-	-	2	1

Course Objective:

The objective of this course is to enable student to implement database related queries usingMongoDB.

Course Outcome	Upon Successful Completion Of This Course, Students Should Have The Knowledge And Skills To
CO1	Installation of mongo db ,configuring, running mongo db
CO2	Implementation of crud operations
CO3	Implementing index methods, aggregation methods
CO4	To study and implement DDL, DML commands usingMYSQL
CO5	Implementing MySQL Programmes using Control Structuresand functions.

1. Installing configuring running of MongoDB
2 Working with data base commands in mongo db
3. Working with crud operations in mongo db
4. Implementing aggregation operations in mongo db
5. Implementing index operations
6. Working with create, alter, drop, rename and Truncate tables using MYSQL
7. Working with insert, update, delete, select statements using MYSQL
8. Write an MYSQL Program to retrieve the data from two tables using joins.
9. Write a MYSQL program to retrieve and display the names of the top5 students with highest marks ina specified course.
10. Write an MYSQL Program to calculate the average marks of all students and display it along withtheir name.

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P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2024-2025)
II B.Sc (CS)
SEMESTER-III

SUBJECT: DOCUMENT ORIENTED DATABASE
Time: 2½ Hrs
PAPER- IV **Marks: 50**

Model blue print for the model paper and choice

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

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

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

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

II B.Sc (CS)

SUBJECT: DOCUMENT ORIENTED DATABASE

Time: 2½ Hrs. **Marks: 50**

SEMESTER-III

SECTION –I

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

Part-A

1. Discuss about DBMS Architecture in detail?
2. Explain features of MongaDB?
3. Explain about MongoDB CRUD Operations?

Part-B

4. Explain about Three scheme Architectue?
5. Discuss about Data Modelling?
6. Define Index? Explain working with Index.

SECTION – II

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

7. What are the characteristics of DB Approach?
8. Explain about Enforcing Integrity constraints?
9. Explain types of NoSql DB?
10. Explain data types of Mango?
11. Explain about Create and Read operations in MongoDB?
12. Write about Aggregate
13. Write short notes on types of index?

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester II B.Sc. AI(III Sem.)			
Course Code	**TITLE OF THE COURSE** **Paper 5: Operating Systems**				
Teaching	HoursAllocated:45(Theory)	L	T	P	C
Pre-requisites:	Understanding of basic computer concepts	3		-	3

Course Objectives

1. To understand the services provided by and the design of an operating system.
2. To understand what a process is and how processes are synchronized and scheduled.
3. To understand different approaches to memory management.
4. To understand the structure and commands in unix
5. Students should be able to understand shell programming

Course Outcomes:

COURSE OUTCOM ENO	UPON SUCCESSFUL COMPLETION OF THIS COUSHOULD HAVE THE KNOWLEDGE AND SKILLS
CO1	Analyze the services and functions of operating systems
Co2	Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a givenproblem instance.
Co3	Analyze memory management techniques, concepts ofvirtual memory
Co4	To understand Introduction to Unix:- Architecture of Unix,Features of Unix , Unix Commands
Co5	To understand **Shell programming and** Simple shellprogram examples

UNIT – I

Operating System:

Introduction, Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations. Evolution of Operating Systems ,types of operating system, Simple ,Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems, Operating System services.

UNIT – II

Process and CPU Scheduling:

Process concepts The Process, Process State, Process Control Block, Process communication.

Threads. Process Scheduling Scheduling Queues, Schedulers, Context Switch, Pre-emptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms,Process Synchronization, The Critical section Problem, Semaphores, Classic Problems of Synchronization,

UNIT – III

Memory Management and Virtual Memory :

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

UNIT – IV

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

UNIT – V

Shell programming:

Ordinary and environment variables. The profile. Read and read only commands. Command line arguments. exit and exit status of a command. Logical operators for conditional execution. The test command and its shortcut. The if, while, for and case control statements. The set and shift commands and handling positional parameters. The here (<<) document and trap command. Simple shell program examples.

TEXT BOOK:

1. "Operating System Concepts"-Silberschatz, Galvin, Gagne-–eight Edition-John Willey &Sons INC 1,2,3 units
2. Sumitabha Das., Unix Concepts and Applications., 4thEdition., Tata McGraw Hill(4,5) units

REFERENCES BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition,Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press

Student Activity:

1. Load any new operating system into your computer.

2. Partition the memory in your system

3. Create a semaphore for process synchronization.

Recommended Co – Curricular Activities:

Measurable

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

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
Program & Semester: II B.Sc. AI (III Sem.)
Operating System Model paper
SEMESTER – III

Time: 2 Hours Max **Marks: 50M**

Section -I

Answer any three of the following questions. Must attempt atleast one question from each part. Each question carries 10 Marks.

3 X 10 = 30M

Part – A

1. What are the different types of OS? Explain.
2. What is meant by Real-Time operating system? Its functions and types?
3. Demonstrate Page replacement algorithms?

Part – B

4. What is meant by Real-Time operating system? Its functions and types?
5. What is mean by Architecure of Unix and its commands?
6. Demonstrate Environmental variables?

Section II

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

4 X 5 = 20M

7. Define operating systems and its functions?
8. Explain different types of schedulers?
9. Write about semaphores?
10. Explain Segmentation?
11. Demonstrate Page replacement algorithms?
12. Explain features of UNIX?
13. Explain Logical operators in shell programming?

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester I B.Sc. AI(I Sem.)			
Course Code	**TITLEOFTHECOURSE** Paper 5: **Operating Systems Lab**				
Teaching	HoursAllocated:30(Theory)	L	T	P	C
Pre-requisites:		3		-	3

Course Objective:

This course enables students to develop OS scheduling logics and also to gain hands-on experience of UNIX OS.

COURSE OUTCOM ENO	UPON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS SHOULD HAVE THE KNOWLEDGE AND SKILLS TO:
CO1	To implement CPU scheduling algorithms in c programminglanguage
CO2	To implement file/directory handling commands in Unix.
CO3	To display list of currently logged users in Unix shell script
CO4	To implement binary search using shell script
CO5	To implement Fibonacci series using shell script

LAB LIST

1. Write the program to implement CPU scheduling algorithm for first come first serve Scheduling
2. Write a program to implement CPU scheduling algorithm for shortest job first scheduling.
3. Write a ‘C’ program to perform priority scheduling.
4. Write a program to implement CPU scheduling for Round Robin Scheduling.
5. Execute various file/directory handling commands in UNIX.
6. Write a Simple shell script for basic arithmetic and logical calculations.
7. Write a shell script to display list of users currently logged in.
8. Write a shell script to delete all the temporary files.
9. Write a shell script to search an element from an array using binary searching.
10. Write a shell script to determine whether a given number is a prime number or not
11. Write a shell script to print the first *n* Fibonacci numbers.
12. Execute various system administrative commands

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	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterII B.Sc. AI-Major (III Sem.)			
Course Code	DATA STRUCTURES USING 'C'				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	C programming	3	-	-	3

Course Objectives:

- The objective of the course is to Introduce the fundamental concept of data structures and abstract data types
- Emphasize the importance of data structures in developing and implementing efficient algorithms
- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs arerepresented in memory and used by algorithms

Course Outcomes:

- After completing this course a student will be able to: Summarize the properties, interfaces, and behaviors of basic abstract data types
- Discuss the computational efficiency of the principal algorithms for sorting &searching Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
- Demonstrate different methods for traversing trees

UNIT I: Data Structures - Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), and Preliminaries of algorithms. Time and Space complexity. **Searching**- Linear search, Binary search. **Sorting**- Insertion sort, Selection sort, Bubble sort, quick sort, merging (Merge sort) algorithms.

UNIT II Linked List: Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list-Insertion, Deletion, Search and Traversal ,Reversing Single Linked list, Applications on Single Linked list- Sparse Matrix Representation using Linked List, Advantages and Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.

UNIT III Queues & Stacks: Introduction to Queues, Representation of Queues-using Arrays and using Linked list, Implementation of Queues-using Arrays and using Linked list, Application of Queues-Circular Queues, Deques, Priority Queues. **Stacks:** Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Linked list Representation of Stacks,

Operations on Linked Stack, Applications- Infix to Postfix Conversion, Evaluating Postfix Expressions.

UNIT IV Trees: Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees using Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Balanced Binary Trees AVL Trees, Insertion, Deletion and Rotations.

UNIT V Graphs: Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims &Kruskals Algorithm,Dijkstra's shortest path, Transitive closure, Warshall's Algorithm.

Text Books:

1. Data Structures Using C. 2ndEdition.ReemaThareja, Oxford.
2. Data Structures andalgorithm analysis in C, 2nded, Mark Allen Weiss.

Reference Books:

1. Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Sahni,Universities Press
2. Data Structures: A Pseudo Code Approach, 2/e, Richard F.Gilberg, BehrouzA. Forouzon, Cengage.
3. Data Structures with C, Seymour LipschutzTMH

e-Resources:

1. http://algs4.cs.princeton.edu/home/
2. https://faculty.washington.edu/jstraub/dsa/Master_2_7a.pdf

MODEL BLUE PRINT FOR QUESTION PAPER SETTER

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted tothe chapter
UNIT-1	2	1	25
UNIT-2	1	2	20
UNIT-3	1	2	20
UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
Program & Semester: II B.Sc. AI (III Sem.)
DATA STRUCTURES USING Model paper
SEMESTER – II
Time: 2 Hours Max Marks: 50M

Section -I

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

Part – A

1. What is Abstract Data Type (ADT)? How does an Abstract Data Type (ADT) simplify the use of data structures, and why is it important in software development?
2. What is a queue? Describe how a queue can be implemented with an array?
3. Describe Prim's algorithm for finding a Minimum Spanning Tree (MST). Provide a step-by-step example of how it works.

Part – B

4. Define data structure. Explain different types of data structure
5. Describe the process of adding a new node to a single linked list in three different scenarios: at the start, at an arbitrary position, and at the end.
6. Explain the procedure for deleting a node from a binary search tree. Discuss the different cases that need to be handled during deletion.

Section II

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

7. Explain the difference between linear and non-linear data structures with examples
8. Describe the traversal operation in a single linked list. Why is it important?
9. List advantages and disadvantages of using a single linked list
10. Define a priority queue and what are its typical applications?
11. Explain the process of pushing and popping elements in a stack implemented with a linked list.
12. What is a binary search tree (BST)? Explain its key properties
13. Explain the following terms

i. Vertex (or node) ii. Edge iii. Degree iv. Path v. Subgraph

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterII B.sc Major (III Sem.)			
Course Code	DATA STRUCTURES USING 'C' Lab				
Teaching	Hours Allocated: 30 (Theory)	L	T	P	C
Pre-requisites:	C programming	-	-	2	1

1. Write a program to read 'n' numbers of elements into an array and insert an element in specified position of that array.
2. Write a program to search an item in a given list using the following Searching algorithms
    a. Linear Search b. Binary Search.
3. Write a program for the implementation of Bubble Sort
4. Write a program for the implementation of Insertion Sort
5. Write a program for the implementation of Quick Sort
6. Write a program for the implementation of Merge Sort
7. Write Programs to implement the Stack operations using an array
8. Write a program using stacks to convert an infix expression to postfix
9. Write a program to implement the Stack operations using Liked List.
10. Write a program to implement the Queue operations using an array.
11. Write a program to implement the Queue operations using Liked List.
12. Write a program for Binary Search Tree operations
13. Write a program to implement Depth First Search graph traversals algorithm
14. Write a program to implement Breadth First Search graph traversals algorithm

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterII B.Sc. AI-Major (III Sem.)			
Course Code	**INFERENTIAL STATISTICS**				
Teaching	**Hours Allocated: 45(Theory)**	L	T	P	C
Pre-requisites:		3	-	-	3

Course Objective:

This course enables students to gain knowledge in sampling, hypothesis testing and non parametricmethods.

Course Outcomes:

After going through this course, the students will get

CO1: a fundamental understanding of Parametric models for developing relevant inferences onassociated parameters,

CO2: knowledge of point and interval estimation procedures and different methods of point estimation,

CO3: using Neyman Pearson Lemma and finding Uniformly Most Powerful Test,

CO4:various basic concepts on sampling distributions and large sample tests based on normaldistribution,

CO5 : small sample tests based on chi-square, Student's and Snedecor's F distributions

Unit I

Theory of Estimation: Parameter, Statistic, Standard Error of the statistic, concept of bias and mean square error of an estimate, Criteria of good estimator - unbiasedness, consistency, efficiency, and sufficiency. Methods of estimation- Maximum Likelihood estimator(MLE) and Method of Moments(MME).Concepts of confidence interval and confidence coefficient, confidence intervals for the parameters of univariate normal,

Unit II

Testing of Hypothesis : Statistical hypotheses, critical region, size and power of a test, most powerful test, two types of errors. Neyman Pearson lemma(WITHOUT PROOF) and its applications, uniformly most powerful unbiased test . One and two tailed tests. Procedure for testing of hypothesis, Tests of significance of large samples - Single proportion and difference of proportions, single mean and difference of means.

Unit III

Exact Sampling distributions : Student's t-distribution, Chi-square distribution, Snedecor's

Fdistribution – definitions, properties and applications. Tests of significance for small samples: Student's t-distribution - single mean, difference of means and paired t-test. Chi-square distribution- test for goodness of fit and independence of attributes.

Unit IV

F-distribution – definition, properties and applications – F-test for equality of two population variances. ANOVA one way and two-way classifications

Unit V

Non-parametric methods- definition, advantages and disadvantages. One sample test- Sign test, Run test, Wilcoxon-signed rank test. Two independent sample tests: Median test, Wilcoxon- Mann Whitney U - test, Kruskal Wallis test - Simple Problems Note: Without proofs of named theorems and more importance to applications.

TEXT BOOK:

1. S.C. Gupta, (2019), Seventh Edition, Fundamentals of Statistics, Mumbai: Himalaya PublishingHouse.

REFERENCE BOOKS

1. Sharma, J. K. (2013), Business statistics, New Delhi: Pearson Education

2. Levine, D.M., Berenson, M. L. & Stephan, D. (2012), Statistics for managers using MicrosoftExcel, New Delhi: Prentice Hall India Pvt.

3. Aczel, A. D. &Sounderpandian, J. (2011), Complete Business Statistics, New Delhi: Tata McGrawHill.

4. Anderson, D., Sweeney, D., Williams, T., Camm, J., & Cochran, J. (2013), Statistics for Businessand Economics, New Delhi: Cengage Learning.

5. Davis, G., &Pecar, B. (2014), Business Statistics using Excel, New Delhi: Oxford University Press.Websites of Interest:

http://onlinestatbook.com/rvls/index.

htmlCo-Curricular Activities in the

class:

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples

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	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterII B.Sc. AI-Major (III Sem.)			
Course Code	**INFERENTIAL STATISTICS Lab**				
Teaching	**Hours Allocated: 30(Practical)**	L	T	P	C
Pre-requisites:		-	-	2	1

Course Objective:

This course enables students to gain hands-on practical experience of SPSS for analysing data byimplementing sample tests, ANOVA and nonparametric tests..

Course Outcome:

Upon successful completion of this course, students should have the knowledge and skills to:CO1: Apply the various statistical methods for real life problems PO2

CO2 Apply the SPSS techniques and give the interpretations.

PO2List of Practicals using SPSS

1. Large Sample Tests: Test of significance of (a) Single Mean (b) Difference of means

2. Large Sample Tests: Test of significance of (a) Single Proportion (b) Difference of Proportions

3. Small Sample Tests: t-Test for significance of (a) Single mean (b) Difference of means-samples areindependent (c) Difference of means- samples are dependent

4. Chi square Test of (a) Independence 2x2 Cross tabulation, (b) Goodness of fit5 Test for several means ANOVA (a) One-way (b) Two-way classification,

6 Non Parametric Tests (a) Mann Whitney U test, (b) Wilcoxon Signed ranks test, (c) Kruskal Wallis Test, (d) Friedman test Note: Training shall be in SPSS and derive the results. The SPSS output shall be exported to MS word for writing inference.

Reference Manual: Practical Manual -Prepared by the Department Faculty MembersWebsites of Interest: http://www.statsci.org/datasets.html

Scheme of Valuation for Practical Paper (i) Continuous evaluation 10 Marks (ii) External Evaluation:40 marks

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P.R.GOVT.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPERS FOR THE YEAR 2023-2024
II B.Sc. (AI) 2023-2027 BATCH
Artificial Intelligence COURSE: Inferential statistics

Time: 2.30 Hrs. **SEMESTER-III** **Max. Marks: 50**

SECTION-A

Answer any FOUR Questions **(4x5=20M)**

1. Explain about Efficiency?
2. Discuss about one tailed and two tailed tests?
3. Define Most powerful test?
4. Writeabout applications of student's t distribution?
5. Explain about Importance of Normal distribution?
6. Explain about Exact Sampling distributions
7. Define Run test?

SECTION-B

Answer All Questions **(3x10=30M)**

8. a) Explain about Criteria of good estimator?

   (Or)

   b) Explain abouttest for single mean?

9. a)Define (i) type-I,type-II errors (ii) Critical region (iii) Power of test?

   (Or)

   b) Explain about chi-square test for goodness of fit ?

10. a) Explain about ANOVA one way classification

    (Or)

    b) Explain about Median test ?

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2023-2024
II B.SC (AI) 2023-2027 BATCH
Artificial Intelligence Course: Inferential Statistics
COURSE CODE:

Time : 2.30 Hrs. **SEMESTER-III** **Max. Marks: 50**

Model Blue print for the question paper setter

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

SEMESTER-IV

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	DATA WAREHOUSING AND DATA MINING	II B.Sc. AI-Major (IV Sem.)			
Teaching	**Hours Allocated: 45(Theory)**	L	T	P	C
Pre-requisites:		3	-	-	2

OBJECTIVE:

The course should enable the students to learn principles of Data warehousing and data mining with its architecture and understand data preprocessing methods to perform classification and prediction of data. Technical knowledge is helpful to implement Data Mining principles and techniques for real time applications.

Course Outcomes :

CO. NO.	Upon successful completion of this course, studentsshould have the knowledge and skills to
1	To understand the principles of Data warehousing and DataMining.
2	To be familiar with the Data warehouse architecture and itsImplementation.
3	To know the Architecture of a Data Mining system.
4	To understand the various Data preprocessing Methods.
5	To perform classification and prediction of data.

UNIT I

Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse –Data Warehouse Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation- Architecture Of A Typical Data Mining Systems- Classification Of

Data Mining Systems.

Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III

Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT IV

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V

Mining Object, Spatial, Multimedia, Text and Web Data:

Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

Text Book

1. Jiawei Han, Micheline Kamber and Jian Pei“Data Mining Concepts and Techniques”, Third Edition,Elsevier, 2011.

Reference Books

1. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, TataMcGraw – Hill Edition, Tenth Reprint 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter EconomyEdition, Prentice Hall of India, 2006.
4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data

Mining",Pearson Education, 2007.

RECOMMENDED CO-CURRICULAR ACTIVITIES:

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

A. Measurable

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

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

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

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DATA WAREHOUSING AND DATA MINING

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

Course Objectives:

This course enables students to practically implement various data mining techniques.

Course Outcomes:

By the end of this course, students will be able to

CO1: implement data files conversions and can train, test data sets for an application. (PO5, PO7)CO2: generate accurate models, and demonstrate data pre - processing. (PO5, PO7)

CO3: Demonstrate text mining and web mining techniques. (PO4, PO7)

LAB EXPERIMENTS:

1. List applications for mining
2. File format for data mining
3. Conversion of various data files
4. Training the given dataset for an application
5. Testing the given dataset for an application
6. Generating accurate models
7. Data pre-processing – data filters
8. Feature selection
9. Web mining
10. Text mining
11. Design of fact & dimension tables
12. Generating graphs for star schema

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PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADADEPARTMENT OF COMPUTER SCIENCE

DATA MINING AND DATA WAREHOUSING

SEMESTER- IV

Time:2.30Hrs **Max Marks:50M**

Section-I

Answer any three of the following questions. Must attempt atleast one question from each part. Each question carries 10Marks **3X10=30M**

Part-A

1.What is Data Warehousing? Explain Data Warehousing Architecture?2.What is olap? Explain its types?

3. Define Classification of Data Mining systems?

Part-B

4. Explain Bayesian classification?

5. Explain any two major Clustering methods?

6. What is multimedia data mining and explain its categories and applications ofdata mining ?

SECTION-II

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

4X5=20M

7. Why is metadata is necessary in a data warehouse?

8.What is multidimensional data model?

9.Determine the difference between Data mining and Data Warehouse?

10.What is mean by data preprocessing?

11.Difference between Classifier and Predictor?12.Define cluster analysis?

13.Determine the process of text mining?

MODEL BLUE PRINT FOR MODULE WISE FOR THE YEAR2024-2025

II B.SC(AI) 2024-2025 BATCH

Data Mining and Data WarehousingSEMESTER-IV

Time:2.30Hrs **Max Marks:50**

Model Blue print for the question paper setter

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

Course Code	**MACHINE LEARNING USING PYTHON**	II B.Sc. AI-Major (IV Sem.)			
Teaching	**Hours Allocated: 45(Theory)**	L	T	P	C
Pre-requisites:		3	-	-	2

OBJECTIVES:

- To understand the basic concepts of machine learning.
- To understand and build supervised learning models.
- To understand and build unsupervised learning models.
- To evaluate the algorithms based on corresponding metrics identified

Course Outcomes :

At the end of this course, the students will be able to:

CO1: Explain the basic concepts of machine learning.

CO2 : Construct supervised learning models.

CO3 : Construct unsupervised learning algorithms.

CO4: Evaluate and compare different models

UNIT I INTRODUCTION TO MACHINE LEARNING

Review of Linear Algebra for machine learning; Introduction and motivation for machine learning; Examples of machine learning applications, Vapnik-Chervonenkis (VC) dimension, Probably Approximately Correct (PAC) learning, Hypothesis spaces, Inductive bias, Generalization, Bias variance trade-off.

UNIT II SUPERVISED LEARNING

Linear Regression Models: Least squares, single & multiple variables, Bayesian linear regression, gradient descent, Linear Classification Models: Discriminant function – Perceptron algorithm, Probabilistic discriminative model - Logistic regression, Probabilistic generative model – Naive Bayes, Maximum margin classifier – Support vector machine, Decision Tree, Random Forests

UNIT III ENSEMBLE TECHNIQUES AND UNSUPERVISED LEARNING

Combining multiple learners: Model combination schemes, Voting, Ensemble Learning - bagging, boosting, stacking, Unsupervised learning: K-means,

Instance Based Learning: KNN, Gaussian mixture models and Expectation maximization.

UNIT IV NEURAL NETWORKS

Multilayer perceptron, activation functions, network training – gradient descent optimization – stochastic gradient descent, error backpropagation, from shallow networks to deep networks –Unit saturation (aka the vanishing gradient problem) – ReLU, hyperparameter tuning, batch normalization, regularization, dropout.

UNIT V DESIGN AND ANALYSIS OF MACHINE LEARNING EXPERIMENTS

Guidelines for machine learning experiments, Cross Validation (CV) and resampling – K-fold CV, bootstrapping, measuring classifier performance, assessing a single classification algorithm and comparing two classification algorithms – *t* test, McNemar's test, K-fold CV paired *t* test

TEXT BOOKS:

1. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Fourth Edition,2020.
2. Stephen Marsland, "Machine Learning: An Algorithmic Perspective,"Second Edition", CRC Press, 2014.

REFERENCES

1. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer,2006.
2. Tom Mitchell, "Machine Learning", McGraw Hill, 3rd Edition, 1997.
3. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, "Foundations of Machine Learning", Second Edition, MIT Press,~~2012~~, 2018.
4. Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press,2016
5. Sebastain Raschka, Vahid Mirjalili , "Python Machine Learning",Packt publishing 3rd Edition, 2019.

Recommended Co – Curricular Activities:

A. Measurable

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

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

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	**MACHINE LEARNING USING PYTHON Lab**	II B.Sc. AI-Major (V Sem.)			
Teaching	**Hours Allocated: 30(Practical)**	L	T	P	C
Pre-requisites:		-	-	2	1

OBJECTIVES:

- To understand the basic concepts of machine learning.
- To understand and build supervised learning models.
- To understand and build unsupervised learning models.
- To evaluate the algorithms based on corresponding metrics identified

Course Outcomes :

At the end of this course, the students will be able to:

CO1: Explain the basic concepts of machine learning.

CO2 : Construct supervised learning models.

CO3 : Construct unsupervised learning algorithms.

CO4: Evaluate and compare different models

EXPERIMENT LIST:

1. Write a python program to import and export data using Pandas library functions.
2. Demonstrate various data pre-processing techniques for a given dataset
3. Implement Dimensionality reduction using Principle Component Analysis (PCA) method.
4. Write a Python program to demonstrate various Data Visualization Techniques.
5. Implement Simple and Multiple Linear Regression Models.
6. Develop Logistic Regression Model for a given dataset.
7. Develop Decision Tree Classification model for a given dataset and use it to classify anew sample.
8. Implement Naïve Bayes Classification in Python.
9. Build KNN Classification model for a given dataset.
10. Build Artificial Neural Network model with back propagation on a given dataset.
    a. Implement Random forest ensemble method on a given dataset.
    b. Implement Boosting ensemble method on a given dataset.
11. Write a python program to implement K-Means clustering Algorithm.

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PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
MACHINE LEARNING USING PYTHON
SEMESTER-IV

Time:2.30Hours **MaxMarks:50M**

SECTION-I

Answer any three of the following questions. Must attempt atleast one question from each part. Each question carries 10Marks **3X10=30M**

Part-A

1. Define linear algebra and explain with an example how linear algebra concepts are used in machine learning algorithms?
2.How do different types of inductive bias affect the learning process and the resultingmodels?
3.What is the naive Bayes classifierand how does it utilize Bayes' theorem for classification?

Part-B

4.What is the K-means clustering algorithmand how does it partition data points into clusters based on similarity?
5.What is regularization and how does it prevent overfitting in neural networks?
6.What methods can be used to compare the performance of two classification algorithms?

SECTION-II

Answer any four of the following questions. Each question carries 5Marks. **4X5=20M**

7.What is generalization in the context of machine learning?
8.What does the concept of PAC learning entail in machine learning?
9. What are the limitations of the perceptron algorithm?
10.Explain the difference between single and multiple variable linear regression?
11.Explain the process of meta-learning in stacking ?
12.Explain the normalization process ?
13.What is bootstrappingand how does it differ from K-fold cross validation?

MODEL BLUE PRINT FOR MODULE WISE FOR THE YEAR 2024-2025

II B.SC(AI) 2024-2025 BATCH
MACHINE LEARNING USING PYTHON
SEMESTER-IV

Time:2.30Hrs **MaxMarks:50**

Model Blue print for the question paper setter

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

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	**INTRODUCTION TO AI**	II B.Sc. AI-Major (IV Sem.)			
Teaching	**Hours Allocated: 45(Practical)**	L	T	P	C
Pre-requisites:		3	-	-	2

Course Objective:

The objective of this course is to educate students in basic Artificial Intelligence concepts and provide insights of solving problems using AI. This course also aims to educate students in basics of practical natural language processing and robotics.

Course Outcomes:

COURSE OUTCOME NO	Upon successful completion of this course, students should havethe knowledge and skills to:	**PROGRAM OUTCOME NO**
CO1	Understand the need of AI and Intelligent Agents.	PO5, PO7
CO_2	Understand knowledge based agents and prepositional logic.	PO5, PO7
CO_3	Gain knowledge about learning agents and decision trees.	PO5, PO7
CO_4	Gain knowledge about practical applications of NLP.	PO5, PO7
CO_5	Understand parts, tasks and architecture of Robotics.	PO5, PO7

UNIT – I:

Introduction to AI: What is AI? AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT-II:

Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Hill climbing, A*, AO* Algorithms, Problem reduction, Game Playing-Adversial search, Games, mini-max algorithm, optimal decisions in multiplayer games, Problem in Game playing, Alpha-Beta pruning, Evaluation functions.

UNIT-III:

Knowledge representation issues, predicate logic- logic programming, semantic nets- frames

and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems. Reasoning under uncertainty, review of probability, Baye's probabilistic interferences and dempstershafer theory.

UNIT-IV

First order logic: Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, learning from observation Inductive learning, Decision trees, Explanation based learning, Statistical Learning methods, Reinforcement Learning.

UNIT-V:

Expert systems:- Introduction, basic concepts, structure of expert systems, the human element in expert systems how expert systems works, problem areas addressed by expert systems, expert systems success factors, types of expert systems, knowledge engineering, scope of knowledge, difficulties in knowledge acquisition methods of machine learning, selecting an appropriate knowledge acquisition method, societal impacts reasoning in artificial intelligence, inference with rules, with frames: model based reasoning, case based reasoning, explanation & meta knowledge inference with uncertainty.

TEXT BOOKS

Stuart Russell, Peter Norvig: "Artificial Intelligence: A Modern Approach",2nd Edition,Pearson Education, 2007

REFERENCES

1. Artificial Neural Networks B. Yagna Narayana, PHI
2. Artificial Intelligence, 2nd Edition, E.Rich and K.Knight (TMH).
3. Artificial Intelligence and Expert Systems – Patterson PHI.
4. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
5. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.
6. Neural Networks Simon Haykin PHI

Web Resources:

https://www.javatpoint.com/artificial-intelligence-ai

https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_overview.html

https://www.academia.edu/32098490/Introduction_to_artificial_intelligence

Recommended Co – Curricular Activities:

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

A: Measurable

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

data (Individuals or groups as teams))

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

B: General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

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

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	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	**INTRODUCTION TO AI Lab**	II B.Sc. AI-Major (IV Sem.)			
Teaching	**Hours Allocated: 30(Practical)**	L	T	P	C
Pre-requisites:		-	-	2	1

Course Objective:

The objective of this course is to enable students to analyse various AI related problems and develop asolution using Python programming language.

Course Outcomes:

COURSE OUTCOME NO	Upon successful completion of this course, students should havethe knowledge and skills to:
CO1	Develop various basic python programs.
CO_2	Analyse and develop solutions for various problems like water jug,Tic – Tack – Toe, etc.
CO_3	Develop programs using DFS, BFS, A* and hill climbingalgorithms.
CO_4	Develop python programs for analysing given data set.
CO_5	Develop python programs for implementing Bayes Classification.

Lab List

1. A) Basic programs in python.
   B) Programs demonstrating list, Vector, Matrix and Array
2. Solving water – jug problem using Python.
3. Implementing DFS and BFS using Python.
4. Solve 8 – puzzle problem using A* algorithm.
5. Solve 8 – puzzle problem using hill climbing Algorithm.
6. Implement Tic – Tac – Toe game using Python.
7. Develop Python code for mini – max algorithm.
8. Develop Python code for Hangman game.
9. A) Develop Python code for removing punctuation marks from the given string.
   B) Develop Python code for sorting the sentence in alphabetical order.
10. A) Using Pylog programming, display first order logic.
    B) Using Pylog programming, display unification process.
11. A) Find mean and mode for given data set.
    B) Calculate variance and standard deviation for given data set.
12. A) Determining probability of a prime number appearing when a 20 sided die is rolled.
    B) Time series analysis to predict rain fall information base on record.
13. Predict the class of testing sample using Bayes Classification.

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P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2024-2025)
II B.Sc. (CS)
SEMESTER-IV

SUBJECT: INTRODUCTION TO ARTIFICIAL INTELLIGENCE PAPER-
Time: 2.00 Hrs Marks: 50

Model blue print for the model paper and choice

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

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

P.R.GOVT.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPER (W.E.F. 2023-2024)
II B.Sc (CS)

SUBJECT: : INTRODUCTION TO ARTIFICIAL INTELLIGENCE PAPER- Time: 2.00 Hrs Marks: 50

SEMESTER-IV

SECTION –I

Answer any three of the following questions. Must attempt atleast one question from each part.

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

Part-A

1. Define AI? Explain about problems or challenges of AI.
2. Explain types of uninformed search algorithms?
3. Explain knowledge representation in AI?

Part-B

4. Explain types of AI Intelligent Agents?
5. Explain inference in First order logic
6. Explain about Expert System.

SECTION – II

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

7. Write the structure of Agents?
8. Explain about history of AI?
9. Write about Hill climbing?
10. Explain Alpha-Beta pruning
11. Explain Baye's probabilistic interferences
12. Explain forward chaining, Backward chaining,
13. Explain structure of expert systems

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR MODULE_WISE FOR THE YEAR 2024-2025
II B.SC (CS) 2024-2025 BATCH

Computer Science Course: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Time: 2.00 Hrs. **SEMESTER-IV** **Max. Marks: 50**

Model Blue print for the question paper setter

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

SEMESTER-V

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (SEMESTER-V)

Course 6A: Web Interface Designing Technologies (W.E.F 2022 – 23)
(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students after successful completion of the course will be able to:

1. Understand and appreciate the web architecture and services.
2. Gain knowledge about various components of a website.
3. Demonstrate skills regarding creation of a static website and an interface to dynamic website.
4. Learn how to install word press and gain the knowledge of installing various plug in to use in their websites.

II. Syllabus :*(Total Hours: 90 including Teaching, Lab, and Field training, Unit tests etc.)*

Unit-I

HTML: Introduction to web designing, difference between web applications and desktop applications, introduction to HTML, HTML structure, elements, attributes, headings, paragraphs, styles, colours, HTML formatting, Quotations, Comments, images, tables, lists, blocks, file paths, layout, symbols, HTML responsive.

Unit– II

HTML forms: HTML form elements, input types, input attributes, HTML 5, HTML graphics, HTML media –video, audio.

CSS: Introduction, syntax, colours, background, borders, margins, padding, height/width, text, fonts, icons, tables, lists, position, over flow, float, CSS combinations,pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms, CSS counters.

Unit– III

Client side Validation: Introduction to JavaScript - What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript-Data and objects in JavaScript, regular expressions, exception handling. DHTML with JavaScript- Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images.

Unit– IV

Word press: Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word

press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

Unit– V

Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site, changing the appearance of site using css, protecting word press web site from hackers.

Additional Inputs:

Create a WordPress website for a college/ University

References:

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley(2007)
2. Paul S.Wang SandaS.Katila, an Introduction to Web Design plus Programming, Thomson (2007).
3. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.
4. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks. Springer, 2007
5. Schaum's Easy Outline HTML, David Mercer, Mcgraw Hill Professional.
6. Word press for Beginners, Dr.Andy Williams.
7. Professional wordpress, Brad Williams, David damstra, Hanstern.
8. Web resources:
    a. http://www.codecademy.com/tracks/web
    b. http://www.w3schools.com
    c. https://www.w3schools.in/wordpress-tutorial/
    d. http://www.homeandlearn.co.uk

Co-Curricular Activities:

a) **Mandatory:***(Training of students by teacher in field related skills:(lab: 10+field: 05):*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours on identifying the case study to build a website, designing the format, structure, menus, submenus etc for a web site and finally to build a website.

2. **For Student**: Students shall (individually) search online and visit any of the agencies like hotels, hospitals, super bazaars, organizations, etc. where there is a need for a website andidentifyanyonecasestudyandsubmitahand-writtenFieldwork/Projectwork/Projectwork/Projectwork/ProjectworkReportnotexceeding10pages.Example:Choosingafirmor business to develop a website, identifying various business entities to be included in the website, identifying menu bar and content to be placed in their websites.

3. Max marks for Fieldwork/Project work/Project work/ Project work/Project work/ Project work Report: 05.

4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, details of place visited, observations, findings and acknowledgements*.

5. Unit tests(IE).

b) Suggested Co-Curricular Activities

1. Build a website with10 pages for the case study identified.
2. Training of students by related industrial experts.
3. Assignments
4. Seminars, Group discussions, Quiz, Debates etc.(on related topics).
5. Presentation by students on best websites.

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

MODEL BLUE PRINT FOR THE YEAR 2023-2024
III B.SC (CS) 2021-2024 BATCH
SEMESTER-V

SUBJECT: 6AWeb Interface Designing Technologies **Time: 2 Hrs**
Max. Marks: 50 **PAPER: VI**

Model blue print for the model paper and choice

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

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

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE

MODEL QUESTION PAPER

6A-Web Interface Designing Technologies (W.E.F 2023 – 24)

SEMESTER – V

Time: 2.00 Hrs **Max Marks: 50 M**

SECTION – I

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

Part – A

1. Explain List tags with examples?
2. Explain Table tag with examples?
3. Explain various types of CSS with examples?

Part - B

4. Explain data time functions in Java Script with examples.
5. Explain features of Word Press?
6. Explain briefly about Themes?

Section II

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

7. Explain anchor tag and image tag with examples?
8. Explain heading and formatting tags in HTML?
9. Discuss box layout in CSS?
10. Write any five string functions in JavaScript?
11. Write any five mathematical functions in JavaScript?
12. What is theme? How to apply themes in Word press?
13. Explain installing and configuring Word press?

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (SEMESTER-V)

Course6A:Web Interface Designing Technologies (W.E.F 2022 – 23)

MODEL PAPER BLUE PRINT

Blue Print

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

P.R.GOVERNMENT COLLEGE (A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)

Course6A:Web Interface Designing Technologies

PRACTICAL SYLLABUS

I. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

1. Create a basic website with the help of HTML and CSS.
2. Acquire the skill of installing word press and various plugins of Wordpress.
3. Create a static website with the help of Wordpress.
4. Create an interface for a dynamic website.
5. Apply various themes for their websites using Wordpress.

II. Practical(Laboratory)Syllabus:*(30hrs.*)

HTML and CSS:

1. Create an HTML document with the following formatting options:

   (a) Bold, (b) Italics, (c) Underline, (d) Headings (Using H1 to H6 heading styles), (e)Font(Type,SizeandColor),(f)Background(Coloredbackground/Imageinbackground),(g)Paragraph,(h)LineBreak,(i)Horizontal Rule,(j) Pre tag

2. Create an HTML document which consists of:

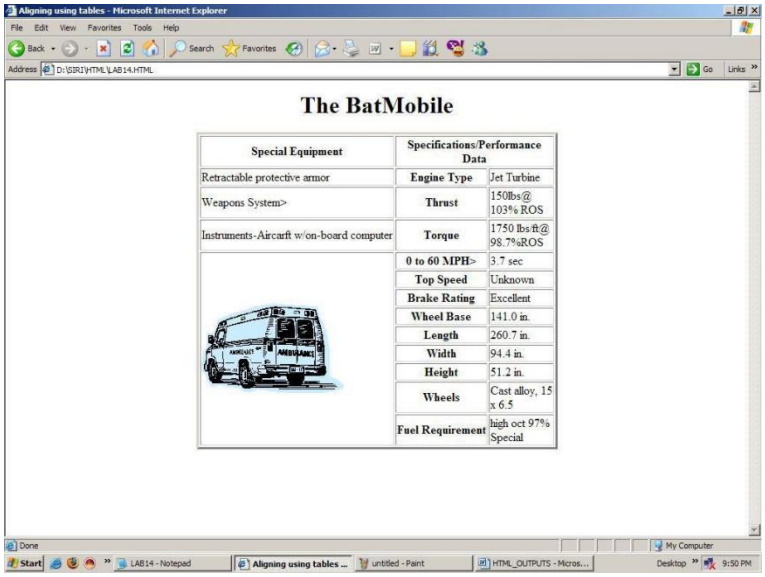
   (a) Ordered List(b)Unordered List(c)Nested List (d)Image

3. Create a Table with four rows and five columns. Place an image in one column.
4. **Using "table" tag, align the images as follows:**

5. Create a menu form using html.
6. Style the menu buttons using CSS.

7. Create a form using HTML which has the following types of controls:
   (a) Text Box(b)Option/radio buttons(c) Checkboxes (d)Reset and Submit buttons
8. Design the page as follows:

Create a webpage containing your biodata (assume the form and fields).



9. Write a html program including style sheets.
10. Write a html program to layers of information in webpage.

Wordpress:

11. Installation and configuration of word press.
12. Create a site and add atheme.
13. Create a child theme
14. Add an external video link with size640X 360.
15. Create a user and assign a role to him.
16. Create a login page to word press using custom links

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23) SEMESTER-V

Course 7A: Web Applications Development using PHP & MYSQL

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students after successful completion of the course will be able to:

1. Write simple programs in PHP.
2. Understand and how to use regular expressions, handle exceptions, and validate data using PHP.
3. Apply In-Built functions and Create User defined functions in PHP programming.
4. Write PHP scripts to handle HTML forms.
5. Write programs to create dynamic and interactive web based applications using PHP and MYS QL.
6. Know how to use PHP with a MySQL database and can write database driven web pages.

II. Syllabus: (Total Hours: 90 including Teaching, Lab, and Field training, Unit tests etc.)

Unit-1: (10 hours)

The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments.

Unit-2: (10 hours)

Working with Arrays: What are Arrays? Creating Arrays , Some Array-Related Functions. Working with Objects: Creating Objects, Object Inheritance, **Working with Strings, Dates and Time**: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

Unit-3: (10 hours)

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads. Working with Cookies and User Sessions: Introducing

Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

Unit-4: (10 hours)

Working with Files and Directories: Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File

Unit-5: (10 hours)

Interacting with MySQL using PHP: Creating Databases and Table in MySQL, MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism.

III. References

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education (2007).
2. Steven Holzner , PHP: The Complete Reference, McGraw-Hill
3. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition O'reilly, 2014
4. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006).
5. Web resources:

e. http://www.codecademy.com/tracks/php

f. http://www.w3schools.com/PHP

g. http://www.tutorialpoint.com

IV. Co-Curricular Activities:

a)Mandatory: (Training of students by teacher in field related skills: (lab: 10 + field: 05) :

1.For Teacher: Field related training of students by the teacher in laboratory/field for not less than 15 hours on demonstrating various interactive and dynamic websites available online, addressing the students on identifying the case study to build an interactive and database driven website, forms to be used in website, database to be maintained, reports to be produced, etc.

2.For Student: Students shall (individually) search online and visit any of the agencies like malls, hotels, super bazaars, etc. where there is a need for an interactive and database driven website and submit a hand-

written Fieldwork/Project work/Project work/Project work/Project work Report not exceeding 10 pages. Example: Choosing a firm or business to develop a website, identifying forms to be placed in the websites, back end databases to be maintained and reports to be generated and placed in the websites.

3.Max marks for Fieldwork/Project work/Project work/Project work/Project work/Project work Report: 05.

4.Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: Title page, student details, index page, details of place or websites visited, structure of the website and acknowledgements.

5.Unit tests.

b)Suggested Co-Curricular Activities

1.Arrange expert lectures by IT experts working professionally in the area of web content development

2.Assignments (in writing or implementing contents related to syllabus or outside the syllabus. Shall be individual and challenging)

3.Seminars, Group discussions, Quiz, Debates etc. (on related topics).

4.Preparation by students on best websites.

5.Arrange a webpage development competition among small groups of students.

P.R.GOVERNMENT COLLEGE(A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)

Course 7A: Web Applications Development using PHP & MYSQL

PRACTICAL SYLLABUS

V. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

1. Write, debug and implement the Programs by applying concepts and error handling techniques of PHP.
2. Create an interactive and dynamic website.
3. Create a website with reports generated from a database.
4. Write programs to create an interactive website for e-commerce sites like online shopping, etc.

VI. Practical (Laboratory) Syllabus: (30 hrs.)

1. Write a PHP program to Display "Hello"
2. Write a PHP Program to display the today's date.
3. Write a PHP program to display Fibonacci series.
4. Write a PHP Program to read the employee details.
5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.
7. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
8. Create Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
9. Write PHP script to demonstrate passing variables with cookies.
10. Write a program to keep track of how many times a visitor has loaded the page.
11. Write a PHP application to add new Rows in a Table.
12. Write a PHP application to modify the Rows in a Table.
13. Write a PHP application to delete the Rows from a Table.
14. Write a PHP application to fetch the Rows in a Table.
15. Develop an PHP application to implement the user registration.
16. Write a PHP script to connect MySQL server from your website.
17. Write a program to read customer information like cust-no, cust-name, item- purchased, and mob-no,

from customer table and display all these information in table format on output screen.

18. Write a program to edit name of customer to “Kiran” with cust-no =1, and to delete record with cust-no=3.

19. Write a program to read employee information like emp-no, emp-name, designation and salary from EMP table and display all this information using table format in your website.

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

MODEL BLUE PRINT FOR THE YEAR 2023-2024
III B.SC (CS) 2021-2024 BATCH
SEMESTER-V

SUBJECT: Web Applications Development using PHP & MYSQL **Time: 2 Hrs.**
Max. Marks: 50 **PAPER: VII**

Model blue print for the model paper and choice

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

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23
MODEL QUESTION PAPER

Course 7A: Web Applications Development using PHP & MYSQL

SEMESTER – V

Time: 2.00 Hrs **Max Marks: 50 M**

SECTION – I

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

Part – A

1. Demonstrate variable scopes in PHP.
2. Discuss various types of arrays in PHP with examples.
3. Explain in detail about cookies and cookie related function in PHP.

Part - B

4. Define function? Demonstrate function with example in PHP.
5. Explain file creation and writing data to it with the help of an example PHP script?
6. Write PHP script to update MYSQL data using PHP?

SECTION II

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

7. List data types in PHP
8. Discuss repetition statements in PHP.
9. Discuss String functions in PHP.
10. Discuss array related functions in PHP
11. Demonstrate a simple FORM data submission in PHP.
12. Explain MySQL database related commands
13. Explain joins in MySQL

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (SEMESTER-V)

MODEL PAPER BLUE PRINT

Blue Print

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

P.R.GOVERNMENT COLLEGE (A), KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)
Course 6B: INTERNET OF THINGS
(Skill Enhancement Course (Elective),Credits:05)

I. Learning Outcomes: Students after successful completion of the course will be able to:

1. Appreciate the technology for IoT
2. Understand various concepts, terminologies and architecture of IoT systems.
3. Understand various applications of IoT
4. Learn how to use various sensors and actuators for design of IoT.
5. Learn how to connect various things to Internet.
6. Learn the skills to develop simple IOT Devices.

II. **Syllabus:** *(Total Hours: 90 including Teaching, Lab, Field training, Unit tests etc.)*

Unit-I (10 hours)

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT andM2M.

Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics ,IoT in Environmental Protection.

Unit-II (10 hours)

Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working ,IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context ,The node, Connecting nodes, Networking Nodes, WSN and IoT.

Unit-III (10 hours)

Wireless Technologies for IoT: WPAN Technologies for IoT: I EEE802.15.4,Zigbee, HART,NFC,Z-Wave, BLE, Bacnet And Mod bus.

IPBasedProtocolsforIoTIPv6,6Low PAN, LoRA, RPL, REST ,AMPQ ,CoAP ,MQTT. Edge connectivity and protocols.

Unit-IV(10 hours)

Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino,InterfacingLED,pushbuttonandbuzzerwithArduino,InterfacingArduino with LCD.

Sensor & Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino ,Interfacing of Relay Switch and Servo Motor with Arduino.

Unit-V(10 hours)

Developing IOT's:Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Thing speak, AWS IoT, Google Cloud IoT Core etc.Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.

III. References

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1stEdition, VPT, 2014
3. DanielMinoli,—"BuildingtheInternetofThingswithIPv6andMIPv6:TheEvolvingWorldofM2MCommunications",ISBN:978-1-118-47347-4,WillyPublications
4. PethuruRajandAnupamaC.Raman,"TheInternetofThings:EnablingTechnologies,Platforms,and Use Cases", CRC Press
5. Open source software/ learning websites
    a. https://github.com/connectIOT/iottoolkit
    b. https://www.arduino.cc/
    c. https://onlinecourses.nptel.ac.in/noc17_cs22/course
    d. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html
    e. Contiki(Open source IoT operating system)
    f. Ardudroid(open source IoT project)
    g. https://blynk.io(Mobileapp)
    h. IoT Toolkit (smart object API gateway service reference implementation)

IV. Co-Curricular Activities:

a) **Mandatory:***(Training of students by teacher in field related skills:(lab: 10+field: 05):*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours on identifying the case study for the IoT, design an IoT solution, build physical IoT device, connect it to a mobile app and deploy the IoT device.

2. **For Student**: Students shall (individually) search online and visit any of the places like aquaculture farms, agencies using IOT devices, etc. to identify problems for IoT solution andsubmitahand-writtenFieldwork/Projectwork/Projectwork/Projectwork/ProjectworkReport not exceeding 10 pages. Example: Choosing a Problem for IoT solution (agriculture, aquaculture, smart home appliances, testing moisture levels, oxygen levels, etc.), reasons why IoT solution is feasible for the said problem, material required, Design and architecture for the proposed IoT device, method of implementation and how to connect the device to mobile.

3. Max marks for Fieldwork/Project work/Project work/Project work/Project work/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, details of websites searched, place visited, observations, findings, proposed IOT problem, and design of the IOT device, implementation and acknowledgements*.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments
3. Preparation and presentation of power-point slides, which include videos, animations, pictures, graphics, etc. by the students.
4. Seminars, Group discussions, Quiz, Debates etc.(on related topics).
5. Field visits to identify the problems for IoT solutions.

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

MODEL BLUE PRINT FOR THE YEAR 2023-2024

III B.SC (CS) 2021-2024 BATCH

SEMESTER-V

SUBJECT: 6B Internet Of Things **Time: 2 Hrs**

Max. Marks: 50 **PAPER: VI**

Model blue print for the model paper and choice

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

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE(W.E.F 2022 – 23)

MODEL QUESTION PAPER

Course 6B: Internet of Things

SEMESTER – V

Time: 2.00 Hrs **Max Marks: 50 M**

SECTION –I

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

Part-A

1. Explain about design objectives of IoT architecture?(OR)
2. Explain various types of Sensors.
3. Explain about Wireless Technologies for the IoT(OR)

Part-B

4. Explain about Data Handling and Analytics.(OR)
5. Explain the Legal challenges in IoT.(OR)
6. Explain various Identifiers in IoT? Explain about Frameworks in IoT?

SECTION –II

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

7. What is the Internet of Things (IoT)? Explain the characteristics of IoT
8. What are the advantages of IoT?
9. Write short notes on Arduino function libraries.
10. Write a shot note on RFID.
11. What are the wireless sensor networks?
12. What are Wireless technologies for the IoT?
13. Explain AWS IOT

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (SEMESTER-V)

Course 6B:Web Internet Of Things (W.E.F 2022 – 23)

MODEL PAPER BLUE PRINT

Blue Print

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

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)

Course 6B:Internet of Things

PRACTICALSYLLABUS

V. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

1. Acquire the skills to design a small IoT device.
2. Connect various sensors, actuators, etc. to Arduino board.
3. Connect the things to Internet
4. Design a small mobile app to control the sensors.
5. Deploy a simple IoT device.

VI. Practical(Laboratory)Syllabus:*(30hrs)*

1. Understanding Arduino UNO Board and Components
2. InstallingandworkwithArduino IDE
3. BlinkingLEDsketchwithArduino
4. Simulationof4-WayTrafficLightwithArduino
5. UsingPulse Width Modulation
6. LEDFadeSketchand ButtonSketch
7. Analog InputSketch(BarGraphwith LEDs andPotentiometre)
8. DigitalRead Serial Sketch (Workingwith DHT/IR/Gas or AnyotherSensor)
9. WorkingwithAdafruitLibrariesinArduino
10. SpinningaDC Motorand Motor SpeedControl Sketch
11. WorkingwithShields
12. Design APP usingBlinkApporThingspeakAPIandconnectitLEDbulb.
13. Design APP UsingBlynk AppandConnecttoTemperature,magneticSensors.

P.R.GOVERNMENT COLLEGE(A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)

Course7B: APPLICATION DEVELOPMENT USING PYTHON
(Skill Enhancement Course (Elective), Credits: 05)

I. **Learning Outcomes:** Students after successful completion of the course will be able to:

1. Understand and appreciate the web architecture and services.
2. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
3. Demonstrate proficiency in handling Strings and File Systems.
4. Create, run and manipulate Python Programs using cored at structures like Lists, Dictionaries and use Regular Expressions.
5. Interpret the concepts of Object-Oriented Programming as used in Python.
6. Apply concepts of Python programming in various fields related to IOT, Web Services and Databases in Python.

II. **Syllabus :***(Total Hours: 90 including Teaching, Lab, and Field training, Unit tests etc.)*

Unit-I (10 hours)

Python basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built- in Functions, Categorizing the Standard Types, Unsupported Types

Numbers-Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules

Sequences-Strings, Lists ,and Tuples, Mapping and Set Types

Unit– II (10 hours)

Files: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules

Exceptions: ExceptionsinPython,DetectingandHandlingExceptions,ContextManagement, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the sys Module, Related Modules

Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes ,Module Built-in Functions, Packages, Other Features of Modules

Unit– III (10 hours)

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

Unit– IV(10 hours)

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

Web Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients,AdvancedWebClients,CGI-HelpingServersProcessClientData,BuildingCGIApplication,Advanced CGI, Web (HTTP) Servers

Unit– V(10 hours)

Database Programming: Introduction, Python Database Application Programmer's Interface (DBAPI), Object Relational Managers (ORMs), Related Modules

III. References

1. **C**ore Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Think Python, Allen Downey, Green Tea Press.
3. Introduction to Python, Kenneth A. Lambert, Cengage.
4. Python Programming : A Modern Approach, Vamsi Kurama, Pearson.
5. Learning Python, Mark Lutz, O'Really.
6. Web sources suggested by the teacher concerned and the college librarian including reading material.

IV. Co-Curricular Activities:

a) **Mandatory:***(Training of students by teacher in field related skills:(lab: 10+field:05)*

1. **For Teacher**: Training of students by the teacher in laboratory/field for not less than 15hourson field related skills like building an IOT device with the help of Python.

2. **For Student**: Students shall (individually) identity the method to link their IOT project done in Paper 7A with Python and submit a hand-written Fieldwork/ Project work/ Project work /Project work/Project work Report not exceeding 10 pages. It should include a brief report on the selected case study of IOT device, algorithm and Python program to operate the IOT device.

3. Max marks for Fieldwork/Project work/ Project work/Project work/Project work/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, design of the IOT device, implementation of Python program to connect the IOT device, findings and acknowledgements*.

5. Unit tests(IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.

2. Assignments

3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).

4. Presentation by students on best websites.

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

MODEL BLUE PRINT FOR THE YEAR 2023-2024

III B.SC (CS) 2021-2024 BATCH

SEMESTER-V

SUBJECT: 7B APPLICATION DEVELOPMENT USING PYTHON **Time: 2 Hrs**
Max. Marks: 50 **PAPERS: VII**

Model blue print for the model paper and choice

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

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)

MODEL QUESTION PAPER

Course 7B: Application Development Using Python
SEMESTER – V

Time: 2.00 Hrs **Max Marks: 50 M**

SECTION-I

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

Part-A

1. Explain different data types in python.
2. Explain control statements with examples
3. Explain the structure of a function with one example

Part-B

4. Explain the concept of Thread creation in Python with example
5. Explain in detail about ORM in Python
6. Explain about Exception handling in Python.

SECTION-II

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

7. Explain different features of pyhton programming language.
8. Explain the structure of a python program.
9. Explain the concept of constructor.
10. Explain the structure to create and access a package.
11. Create simple web client in Python.
12. Write short note on List and Tuples.
13. Explain loops in python

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (SEMESTER-V)

MODEL PAPER BLUE PRINT

Blue Print

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc COMPUTER SCIENCE(W.E.F 2022 – 23)

Course7B: Application Development Using Python–
PRACTICALSYLLABUS

V. **Learning Outcomes:**

On successful completion of this practical course, student shall be able to:

1. Implement simple programs in Python
2. Implement programs related to various data structures like lists, dictionaries, etc.
3. Implement programs related to files.
4. Implement applications related to databases, Web services and IOT.

VI. **Practical (Laboratory) Syllabus** :*(30hrs.*)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a python program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:
   Grade A: Percentage>=80
   Grade B: Percentage>=70 and <80Grade C: Percentage>=60 and <70Grade D: Percentage>=40 and <60GradeE: Percentage<40
3. Write a python program to display the first n terms of Fibonacci series.
4. Write a python program to calculate the sum and product of two compatible matrices.
5. Write a function that takes a character and returns true if it is a vowel and False otherwise.
6. Write a menu – driven program to create mathematical 3D objects
   I. curve
   II. Sphere
   III. Cone
   IV. Arrow
   V. Ring
   VI. Cylinder.
7. Write a python program to read n integers and display the mas a histogram.
8. Write a python program to display sine, cosine, polynomial and exponential curves.
9. Write a python program to plot a graph of people with pulse rate p vs. height h. The values of P and H are to be entered by the user.
10. Write a python program to calculate the mass m in a chemical reaction. The mass m (in gms) d is integrates according to the formula m=60/ (t+2), where t is the time in hours. Sketch a graph fort vs. m, where t>=0.
11. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:
    P (t) = (15000(1+t))/ (15+*e)*

12. Where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t forth e specified time interval.
13. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
    I. velocity wrt time (v=u+at)
    II. distance wrt time(s=u*t+0.5*a*t*t)
    III. distance wrt velocity(s=(v*v-u*u)/2*a)
14. Write a program that takes two lists and returns True if they have at least one common member.
15. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and5th elements.
16. Write a program to implement exception handling.
17. Try to configure the widget with various options like: bg=”green”, family=”times”, size=20.
18. Write a Python program to read last 5lines of a file.
19. Design a simple database application that stores the records and retrieve the same
20. Design a data base application to search the specified record from the database.
21. Design a database application to that allows the user to add, delete and modify the records.

P.R.GOVERNMENT COLLEGE (A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc COMPUTER SCIENCE(W.E.F 2022 – 23)

Course6C: DATA SCIENCE

(Skill Enhancement Course(Elective),Credits:05)

I. **Learning Outcomes:** Students after successful completion of the course will be able to:

1. Develop relevant programming abilities.
2. Demonstrate proficiency with statistical analysis of data.
3. Develop the ability to build and assess data-based models.
4. Demonstrate skill in data management
5. Apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively

II. **Syllabus:** (*(Total Hours: 90including Teaching, Lab, Field training, Unit tests etc.)*

UNIT-I (10hours)

Introduction: The Ascendance of Data, What is Data Science? , Finding key Connectors, Data Scientists You May Know, Salaries and Experience, Paid Accounts, Topics of Interest, Onward.

Python: Getting Python, The Zen of Python, Whitespace Formatting, Modules, Arithmetic, Functions, Strings, Exceptions, Lists, Tuples, Dictionaries, Sets, Control Flow, Truthiness, Sorting, List Comprehensions, Generators and Iterators, Randomness, Object – Orienting Programming, Functional Tools, enumerate, zip and Argument Unpacking, args and kwargs, Welcome to Data Sciencester!

Visualizing Data : Mat plotlib, Barcharts, Linecharts, Scatterplots.

Linear Algebra: Vectors, Matrices

UNIT-II(10 hours)

Statistics: Describing a Single Set of Data, Correlation, Simpson's Paradox, some Other Correlation Caveats, Correlation and Causation.

Probability : Dependence and Independence, Conditional Probability, Bayes's Theorem, Random Variables, Continuous Distributions, The Normal Distribution, The Central Limit Theorem.

Hypothesis and Inference: Statistical Hypothesis Testing, Example: Flipping a Coin ,Confidence Intervals, P-hacking, Example: Running and A/BTest, Bayesian Inference.

Gradient Descent: The Idea behind Gradient Descent, Estimating the Gradient, Using the Gradient, Choosing the Right Step Size, Putting It All Together, Stochastic Gradient Descent.

UNIT-III(10 hours)

Getting Data: Stdin and Stdout, Reading Files – The Basics of Text Files, Delimited Files, Scraping the Web -HTML and the parsing Thereof, Example: O'Reilly Books About Data ,Using APIs – JSON(and XML),Using and Unauthenticated API, Finding APIs.

Working with Data: Exploring Your Data, Exploring One-Dimensional Data, Two Dimensions Many Dimensions, Cleaning and Munging, Manipulating Data, Rescaling, Dimensionality Reduction.

Machine Learning: Modeling, What I is Machine Learning ? Over fitting and under fitting, Correctness, The Bias-Variance Trade-off, Feature Extraction and Selection

UNIT-IV(10 hours)

K-Nearest Neighbors: The Model, Example: Favorite Languages, The Curse of Dimensionality.

Naïve Bayes :A Really Dumb Spam Filter, A More Sophisticated Spam Filter, Implementation, Testing Our Model.

Simple Linear Regression: The Model, Using Gradient Descent, Maximum Likely hood Estimation.

Multiple Regressions: The Model, Further Assumptions of the Least Squares Model, Fitting the Model, Interpreting the Model, Goodness of Fit.

UNIT-V(10hours)

Logistic Regression: The Problem, the Logistic Function, Applying the Model, Goodness of Fit Support Vector Machines.

Decision Trees: What is a Decision Tree? Entropy, the Entropy of a Partition, Creating a Decision Tree, Putting It All Together, Random Forests.

Neural Networks: Perceptron, Feed-Forward Neural Networks and Back Propagation, Example: Defeating a CAPTCHA.

Clustering: The Idea, The Model, Example: Meetups, Choosing k, Example: Clustering Colors, Bottom-up Hierarchical Clustering.

III. References

1. Data Science from Scratch by Joel Grus O'Reilly Media
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, Num Py, and IPython", O'Reilly, 2nd Edition, 2018.
3. JakeVanderPlas,"Python DataScience Handbook: Essential Tools for Working with Data", O'Reilly, 2017.

4. Web resources:
    a. https://www.edx.org/course/analyzing-data-with-python
    b. http://math.ecnu.edu.cn/~lfzhou/seminar/[Joel_Grus]_Data_Science_from_Scratch_First_Princ.pdf
5. 9.Other web sources suggested by the teacher concerned and the college librarian including reading material.

IV. Co-Curricular Activities:

a) **Mandatory:** *(Training of students by teacher infield related skills: (lab: 10+field: 05) :*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for notless than 15 hours on identifying, analyzing and presenting the data and then to predict thefutureinstances.

2. **For Student**: Students shall (individually) search online and visit any of the agencies like Statistical cell, weather forecasting centers, pollution control boards, manufacturing industries, agriculture departments, etc. to observe the manual process going on to collect the data, maintain the data, present the data and to predict the data for future instances and submit a hand-written Fieldwork/ Project work/ Project work / Project work/Project work Report not exceeding 10 pages.

3. Max marks for Fieldwork/Project work/Project work/Project work/Project work/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, details of place visited, observations, findings and acknowledgements*.

5. Unit tests.

b) Suggested Co-Curricular Activities

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

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

MODEL BLUE PRINT FOR THE YEAR 2023-2024

III B.SC (CS) 2021-2024 BATCH

SEMESTER-V

SUBJECT: 6C Data Science **Time: 2 Hrs**

Max. Marks: 50 **PAPERS: VI**

Model blue print for the model paper and choice

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

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc COMPUTER SCIENCE(W.E.F 2022 – 23)

MODEL QUESTION PAPER

Course 6C: Data Science
SEMESTER – V

Time: 2.00 Hrs **Max Marks: 50 M**

SECTION – I

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

Part-A

1. Explain Data visualization in Python with example.
2. Explain Bayes Theory with an example.
3. Discuss Multiple Regressions.

Part-B

4. Justify the need for Dimensionality Reduction.
5. What is Feature Selection? How to perform Feature Selection.
6. What is the process of Statistical hypothesis testing?

SECTION –II

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

7. Write short note on List, Tuple, Dictionary
8. Explain about Normal Distribution.
9. Differentiate Over fitting and Under fitting
10. Write KNN algorithm
11. Explain Clustering and its applications.
12. Discuss Logistic regression
13. Explain classification

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (SEMESTER-V)

MODEL PAPER BLUE PRINT

Blue Print

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE(W.E.F 2022 – 23)

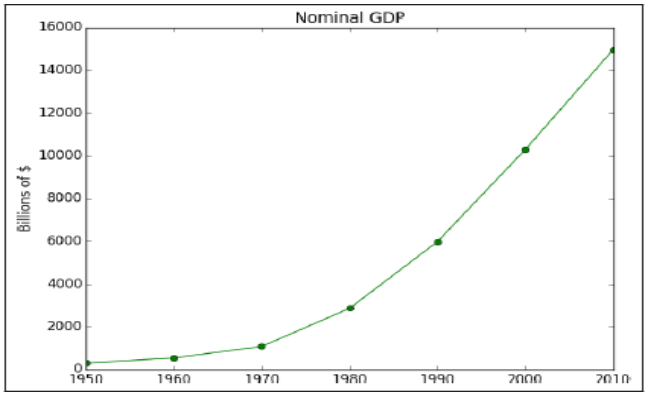
Course6C:Data Science –PRACTICAL SYLLABUS

V. **Learning Outcomes:** On successful completion of this practical course, student shall be able to:

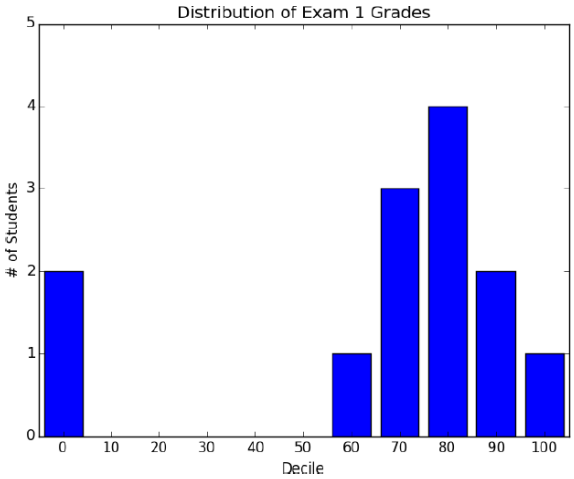
1. Apply data science solutions to real world problems.
2. Implement the programs to get the required data, process it and present the outputs using Python language.
3. Execute statistical analyses with Open source Python software.

VI. **Practical (Laboratory) Syllabus**: *(30hrs.)*

1. Write a Python program to create a line chart for values of year and GDP as given below



2. Write a Python program to create a bar chart to display number of students secured different grading as given below



3. Write a Python program to create a time series chart by taking one year month wise stock data in a CSV file
4. Write a Python program to plot distribution curve
5. Import a CSV file and perform various Statistical and Comparison operations on rows/columns. Write a python program to plot a graph of people with pulse rate pvs. heighth. The values of P and H are to be entered by the user.
6. Import rain fall data of some location with the help of packages available in R Studio and plot a chart of your choice.

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)

Course7C: Python for Data Science
(Skill Enhancement Course (Elective),Credits:05)

I. **Learning Outcomes:** Students after successful completion of the course will be able to:

1. Identify the need for data science and solve basic problems using Python built-in data types and their methods.
2. Design an application with user-defined modules and packages using OOP concept
3. Employ efficient storage and data operations using NumPy arrays.
4. Apply powerful data manipulations using Pandas.
5. Do data pre-processing and visualization using Pandas

II. **Syllabus:** *(Total Hours: 90including Teaching, Lab, Field training, Unit tests etc.)*

Unit-I (10hours)

Introduction to Data Science –Why Python?-Essential Python libraries-Python Introduction- Features, Identifiers, Reserved words, Indentation, Comments, Built-in Data types and their Methods: Strings, List, Tuples, Dictionary, Set - Type Conversion- Operators. Decision Making- Looping- Loop Control statement- Math and Random number functions. User defined functions-function arguments &its types.

UNIT–II(10 hours)

User defined Modules and Packages in Python- Files: File manipulations, File and Directory related methods –Python Exception Handling.

OOPs Concepts- Class and Objects, Constructors–Data hiding-Data Abstraction-Inheritance.

UNIT–III (10 hours)

NumPy Basics: Arrays and Vectorized Computation-The NumPy n-d array-Creating n-d arrays- Data Types for n-d arrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing - Boolean Indexing-Transposing Arrays and Swapping Axes.

Universal Functions: Fast Element-Wise Array Functions-Mathematical and Statistical Methods-Sorting-Unique and Other Set Logic.

UNIT–IV (10 hours)

Introduction to pandas Data Structures: Series, Data Frame and Essential Functionality: Dropping Entries- Indexing, Selection, and Filtering- Function Application and Mapping-Sorting and Ranking.

Summarizing and Computing Descriptive Statistics-Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format.

UNIT–V (10hours)

Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers-String Manipulation: Vectorized String Functions in pandas.

Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

III. References

1. Y. Daniel Liang, "Introduction to Programming using Python", Pearson, 2012.
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and I Python", O'Reilly, 2nd Edition, 2018.
3. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.
4. Wesley J.Chun, "Core Python Programming", Prentice Hall, 2006.
5. Mark Lutz, "Learning Python",O'Reilly,4th Edition, 2009.
6. Web resources:
    a. https://www.edx.org/course/python-basics-for-data-science
    b. https://www.edx.org/course/analyzing-data-with-python
    c. https://www.coursera.org/learn/python-plotting?specialization=data-science-python
    d. https://www.programmer-books.com/introducing-data-science-pdf/
    e. https://www.cs.uky.edu/~keen/115/Haltermanpythonbook.pdf
7. Other web sources suggested by the teacher concerned and the college librarian including reading material.

IV. Co-Curricular Activities:

a) **Mandatory:** *(Training of students by teacher infield related skills: (lab: 10+field: 05) :*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours on collecting the data, analyzing the data and presenting the data using Python language with some real time data.

2. **For Student**: Students shall (individually) visit any of the agencies like Agriculture dept., statistical cell, irrigation department, Ground water department, CPO office, Rural Water Supply and Sanitation department etc. or search online to get real time data like Aids database, weather forecasting database,

social networking data, etc and identify any one database, implement and present the necessary charts in Python language and submit a hand-written Fieldwork/ Projectwork/ Projectwork/ Projectwork/ Project work Report not exceeding 10pages. Example: Identifying a database, get the data, present the data in required charts and to predict the future instances if possible.

3. Max marks for Fieldwork/Project work/Project work/Project work/Project work Report:05.

4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, and details of place visited, observations, method of data collection, database identified, and implementation in Python language, other findings and acknowledgements*.

5. Unit tests(IE).

b) Suggested Co-Curricular Activities

2. Training of students by related industrial experts.

3. Assignments

4. Seminars, Group discussions, Quiz, Debates etc.(on related topics).

5. Presentation by students on the topics within and outside the syllabus

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

MODEL BLUE PRINT FOR THE YEAR 2023-2024
III B.SC (CS) 2021-2024 BATCH
SEMESTER-V

SUBJECT: 7C Python for Data Science **PAPERS: VII**
Time: 2 Hrs **Max. Marks: 50**

Model blue print for the model paper and choice

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

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

P.R.GOVERNMENT COLLEGE(A),KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc COMPUTER SCIENCE (W.E.F 2022 – 23)
MODEL QUESTION PAPER

Course7C: Python for Data Science
SEMESTER – V

Time: 2.00 Hrs **Max Marks: 50 M**

SECTION – I

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

Part-A

1. Explain in detail about Looping control statements in Python.
2. How to create user defined packages in Python.
3. How to create user defined packages in Python.

Part-B

4. How to handle exceptions in python?
5. Discuss various Data cleaning methods
6. Explain about Selecting, Indexing and Filtering?

SECTION –II

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

7. How to slice and transpose arrays
8. Create a python class and object
9. List file and Directory related methods.
10. Explain List and Directory.
11. Explain String manipulations in Python.
12. Discuss Sorting and Ranking in python?
13. Explain control structures in python

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc COMPUTER SCIENCE (SEMESTER-V)

MODEL PAPER BLUE PRINT

Blue Print

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

P.R.GOVERNMENT COLLEGE (A),KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (W.E.F 2022 – 23)

Course7C: Python for Data Science –PRACTICALSYLLABUS

V. **Learning Outcomes:** On successful completion of this practical course, student shall be able to:

1. Implement simple programs in Python.
2. Implement programs related to various structures like arrays, lists, Data frames, etc.
3. Implement programs related to files.
4. Implement applications related o data science.

VI. **Practical (Laboratory) Syllabus**: *(30hrs.*)

1. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary, and Set
2. Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem.
3. Handle numerical operations using math and random number functions
4. Create user-defined functions with different types of function arguments.
5. Create packages and import modules from packages.
6. Perform File manipulations- open, close, read, write, append and copy from one file to another.
7. Write a program for Handle Exceptions using Python Built-in Exceptions
8. Write a program to implement OOP concepts like Data hiding and Data Abstraction.
9. Create NumPy arrays from Python Data Structures, Intrinsic NumPy objects and Random Functions.
10. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
11. Computation on NumPy arrays using Universal Functions and Mathematical methods.
12. Load an image file and do crop and flip operation using NumPy Indexing.
13. Create Pandas Series and Data Frame from various inputs.
14. Import any CSV file to Pandas Data Frame and perform the following:
    (a) Visualize the first and last10records
    (b) Get the shape, index and column details

(c) Select/Delete the records(rows)/columns based on conditions.

(d) Perform ranking and sorting operations.

(e) Do required statistical operations on the given columns.

(f) Find the count and uniqueness of the given categorical values.

(g) Rename single/ multiple columns

15. Import any CSV file to Pandas Data Frame and perform the following:

(a) Handle missing data by detecting and dropping/ filling missing values.

(b) Transform data using apply() and map() method.

(c) Detect and filter outliers.

(d) Perform Factorized String operations on Pandas Series.

(e) Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.

P.R.GOVERNMENT COLLEGE (A), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

III B.Sc. COMPUTER SCIENCE (SEMESTER-V)

MODEL PAPER BLUE PRINT

Blue Print

Chapter Name	Short Questions 5 Marks	Essay Questions 10 Marks	Marks allotted to the chapter
UNIT –I	2	2	30
UNIT –II	1	2	25
UNIT –III	1	2	25
UNIT –IV	2	1	15
UNIT –V	1	1	15
Total No. of questions	7	8	
Total Marks Including choice			115

Certificate Course

Amazon Web Services

Fundamentals of AWS Cloud Computing: Introduction to Cloud Computing, Cloud Environment Architecture, Cloud Computing Models, Introduction to Amazon Web Services, AWS Global Infrastructure

Elastic Compute Cloud: Launching our first EC2 instance, EC2 instance types & Pricing Models, Creating AMI and Image Templates, Understanding Security Groups - a Server-side Firewall

Virtual Private Cloud: Introduction to Network Switches & Virtual Private Cloud, VPC & Subnets, Private and Public Subnets, Internet Gateways, VPC Peering & NAT Gateways, VPN Setup, IP Addressing in AWS

Storage: Introduction to Block & Object storage mechanism, Introduction to Elastic Block Store – EBS, EBS Snapshots, EBS Volume Types, Instance Store Volumes, Introduction to Simple Storage Service (S3), Features of S3, Storage Types, Static Website Hosting, Versioning, Life Cycle Policy, Cross Region Replication, Encryption, Basics of Athena, Introduction to EFS, connect a drive via network, Share the drive among multiple servers

Elastic Load Balancers and Elasticity: Understanding High Availability Configuration, ELB Configuration with Classic and Application Load Balancers, Auto Scaling

Identity & Access Management: Understanding the IAM Policies, IAM User, IAM Policy and IAM Role

Databases: Introduction to Relational Databases, Creating our first database structure in MySQL, Getting started with Dynamo DB, Know about Elastic Cache, Redshift

Decoupling Applications: Amazon SQS, Amazon SNS, Amazon SES, Kinesis Overview

Domain Name System: Introduction to DNS, Understanding DNS Records, Introduction to Route53, Register a Domain using Route 53, Manage DNS Hosts

AWS Cloud Front: Introduction to Cloud Front, Cloud Front with S3, Cloud Front Advanced Concepts

AWS ECS: Getting Started with Containerization, ECS Services and Tasks, Load Balancing in ECS, ECS Scaling

AWS Storage Extras: AWS Snowball, Storage Gateways, Hands on API Gateways

Serverless Computing: Serverless Introduction, Lambda, setting up Server Auto Start with a Lambda Function, Elastic Beanstalk, Host a Sample PHP website using Elastic Beanstalk

AWS CLI and SDK: Getting Started with AWS CLI, AWS CLI setup on EC2 instances, Connect EC2 instance with other AWS services like S3 or SNS or SES

AWS Encryptions: AWS Security, KMS Overview, SSM Parameter Store, Could HSM

Migration Service and Disaster Recovery: Database Migration Services, Data Sync Overview, AWS Backups

Monitoring: Understanding Cloud Watch, Setup Alarms for Matrix changes, Auditing AWS environment with Cloud Trail, Schedule Event Rules using Target based services

Other Services: AWS Key Management Service, Systems Manager Parameter Store

B.Sc IoT

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

Affiliated to Adikavi Nannaya University

Rajamahendravaram

DEPARTMENT OFCOMPUTER SCIENCE

CBCS(CLUSTER PATTERN)

BOARD OF STUDIES

2024-2025

DEPARTMENT OF COLLEGIATE EDUCATION
GOVERNMENT OF ANDHRA PRADESH

PROCEEDINGS OF THE PRINCIPAL, PITHAPUR RAJAH's GOVT. COLLEGE [A] :: KAKINADA
Present: Dr. B.V. TIRUPANYAM, Ph.D.

Rc.No.2/A.C/BOS/2024-25 Dt.23 Apr 2024

Sub: P.R.G.C[A] – Academic Cell - **Conduct of BOS Meetings for the Academic Year 2024-25** – Guidelines issued - Regarding.

The Autonomous colleges are, as per its vision, mission, stated objectives and core values, mandatedto design and develop their own outcome -based curricula keeping in view the societal, local and global industry requirements, employability and industry – ready and transferable skills duly prescribing Course Outcomes (COs), Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) and suitable learning outcome assessment management system through robust and transparent evaluation system to measure their attainment levels by the students.

The Sustained Developmental Goals (SDG-4) of UNEP recommended assurance of quality to students in HEIs promoting creativity, critical thinking and collaborative skills, while building curiosity, courage, resilience and gender equality among students.

Further, the NEP-2020 recommended that the HEIs shall embark upon rolling out 21st century students capable of facing challenges, adaptive to changes, creative and innovative, well rounded students equipped with inventive and creative skills, out-of-box thinking skills, problem solving skills, employability skills,etc., that translate them into leaders and potential entrepreneurs. Hence, the policy recommended internships/ apprenticeships embedded programs. Further, the policy laid much emphasis on rolling out environmentally conscious, value driven, constitution-respecting and socially responsible citizens too.

The HEIs are also, as per the Revised Accreditation Framework [RAF] of NAAC, endowed with the responsibility of rolling out quality and holistic human resources to the modern Indian Economy by ingraining quality in teaching- learning process, integrating IT into teaching-learning and help students experience and prescribed a wide range of participative and experiential learning experiences including field trips, conferences, integration of technology, community service programmes, career guidance, certificate and value added courses, research and inquisition based teaching, exchange programmes, gender equity programmes, collaborations, consultancies, community outreach strategies and encouraged HEIs to be distinctive and unique in practices.

Besides, the students shall have social consciousness, regard for constitutional provisions, right perspective on environmental protection, awareness on gender equity, health and hygiene, Yoga and wellness, college social responsibility, culture and values, etc., to mention a few.

Further, the Ministry of India, GoI, through NIRF, prescribes quality research, infrastructure augmentation, enhanced placement and progression to higher education, equipment of employability skills leading to enhanced public perception about the college among the public.

Further, the A.P State Council of Higher Education, in the Post Graduation eco-system has come out with a revised curricular frame work from the Academic Year 2024-25 incorporating Skill Enhancement Courses, Open Online Courses, Indian Knowledge System, projects works in VI semester, besides new credit structure (APSCHE's curricular frame enclosed).

Our institution has, from AY 2022-23, has devised its new vision and mission along with objectives and core values necessitating design and re-orientation of its academic administration in

tune with them.

ORDER:

In the light of the above mandate and responsibilities prescribed by institution's vision and mission, SDG-4, NEP – 2020, NAAC, NIRF to the autonomous HEIs, to meet the expectations of industries, students, Government and in tune with the APSCHE's revised and new P.G Curricular framework we need to customize, design and re-orient our academic and research administration.

Hence, the Chairmen of U.G and P.G Boards of Studies of various Departments are requested to make necessary arrangements for the conduct of the meetings in the Third week of April 2024. They are further requested to prepare curricula and extracurricular activities and devise suitable evaluation system keeping in mind above recommendations to make students a wholesome personality.

Further, the Chairman of the each BOS, in association with the IQAC coordinator, preceding the BOS meeting, is requested to prescribe benchmarking, quality initiatives in pedagogy and learning; in design of curriculum (with 20% change) and optimum utilization of existing human, physical and ICT resources and adopt resolutions to the extent of benchmarks (As per SOP given in **Annexure – I)**. Further, as the regular attendance of students to the classes is a deciding factor in enhancement of quality in learning, a minimum attendance of 75% for I & II mid-term examinations under CIA component shall be the benchmark for attendance and it shall be approved in the BOS. The Chairmen are also requested to approve the new programmes to be introduced for 2024-25, if any, number of certificate courses, their frequency, Bloom 's- Taxonomy based evaluation system for effective learning outcomes as per the Annexure – I.

Pre-BoS activity:

1. The Chairmen shall send the curricula designed for AY 2023-24 to the Industrialists, Alumni, parents and senior subject experts and get feed back and input on the quality of the syllabi, extra-curricular activities, student-centric activities by 6 April 2024.
2. The Chairmen are, therefore, requested to

- Design curricula of Odd and even semesters for the A.Y 2024-25 both for U.G (I to VIII semesters)and P.G(I to IV Semesters) courses in tune with the stated vision, mission of the institution, RAF of NAAC, NEP-2020 and NIRF.
- It is mandatory to change the syllabus every year for a maximum of 20% .
- Conduct meeting with employers, parents, alumni, shall take feedback on the existing curricula and invite suggestions and changes to be made.
- Invite the University nominee, subject experts, industrial nominees, student nominees, parents well in advance along with the date, venue, agenda, etc. A soft copy shall be communicated well in advance to the members to have an idea on the matters.
- **The Subject experts should be preferably a Doctorate with more than 10 years of teaching experience. He should have experience in designing industry related, market and job oriented curriculum.**
- Facilitate much room for intense deliberation on the design of the curricula, evaluation system, research component, enhancing learning experiences, resource utilization by staff and students, etc.,
- Each Department shall approve and recommend additional credits for additional modules, training programmes, N.S.S, N.C.C, participation in cultural programs, sports and games, environmental programs, blood donations camps, etc.
- All meetings shall be offline. Online attendance of members faculty will be permitted only in exceptional cases.
- The Chairmen shall submit minutes of the meeting in the prescribed format only (Annexure – II) in triplicate (hard copies) to the Academic cell for onward submission to the IQAC, Examination cell and library within three days from the completion of BOS meeting and besides hosting the soft copy in the

college website within the period stipulated.

- Each Chairman of BOS, shall get the rough draft of the curricula verified and approved by the Principal, Academic Cell and IQAC before the actual BOS meetings to ensure uniformity and commensurate with the stated vision and mission of the college among the departments.
- The Academic Cell coordinator shall be the Chief Coordinator for the BOS meeting activity and IQAC coordinator will be the additional coordinator.
- The Academic Coordinator and IQAC coordinators will conduct a meeting with the Chairmen, BOS on 25 April 2024 and explain the structure of curricula, uniformity other modalities.
- The Controller of Examinations of the institution shall fund the BOS meetings from the available funds on the condition of reimbursement after receiving autonomous funds from UGC. Initially, he shall pay Rs. 5,000/- uniformly as an advance to each Chairman towards each course (If BOS meetings for multiple courses are held under one Chairmanship, he/ she shall be given advance amount equivalent to the number of courses x Rs.5000/-)
- The Chairman of each BOS shall apply to the principal for advance amount for meeting the BOS meetings with head-wise expenditure in the prescribed format (Annexure-III).

The chairmen of BOS are instructed to take suggestions from Industrialist (Part of Pre BOS)who is not in the previous BOS as member from industrialist category regarding the change in syllabus for the papers in BOS 2023-24 and proposal for new courses for the Academic year 2024-25 keeping in view of the future job opportunities .

S.No	Title of the Paper	Feedback or suggestions on the curriculum designed during 2023-24 BoS(Whether industry oriented/ relevant for equipping skills for 21st century students)	Proposal of New Courses for 2024-25	Justification

Following contents shall be presented in the BOS document in order

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

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

6. Resolutions adopted in the meeting with detailed discussion that took place during the meeting (Activities and Bench marking as per Annexure –I)
7. At the end of each theory paper, each topic shall be mapped as per the Blooms taxonomy and scope of that topic for skill/ employability/ entrepreneurship opportunities in the following table incorporated

S. No	Subject	Semester	Title of the Course (Paper)	Topic	Parameter as per Blooms taxonomy (Knowledge/ Application/ Creativity/ Innovation	Experiential learning component	Scope (Skill/ employability/ entrepreneurship)
1	III	Botany	Plant Physiology	Plant Cell	Knowledge	Shall be shown Microscope	
2	III	History	Tourism	Tourism management	Application	Apprenticeship	Employability

8. Each BOS Chairman shall, immediately after syllabus, tabulate the changes made in the syllabus/ paper along with justification, in the Proforma given in Annexure – I.
9. Attendance of Members present with signatures in the tabular form.
10. List of Examiners & Paper setters (Minimum 20 members list)
11. Syllabus for each course (both theory & Practical in case of Science subjects) followed by model question papers (theory & practical) and allocation of CIA (50marks) for each course with structure.
12. Each student (2024-25 AB) has to complete one MOOCS course from SWAYAM in any subject per year which is mandatory.

CIA structure for Single Major system

- Out of 50 marks for CIA, 25 marks are allocated for Mid examinations. In each semester two mid examinations to be conducted and the average of the two will be considered.
- I mid examination is to be conducted in offline mode at college level and II mid examination is to be conducted in online mode at department level.
- I mid examination to be conducted in offline mode in which the student should attempt **one essay** question for ten marks out of two questions, **two short** answer questions with five marks each out of four questions and five objective questions to be given for each paper.
- Question paper is to be given as per the following structure for the courses with **4 units**

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

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

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

- The remaining 25 marks for CIA are allocated as per the following structure.

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

CIA structure for 3 Major system

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

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

CIA structure for 3 Major system for Honors programmes(2020-21AB)

- Out of 40 marks for CIA, 20 marks are allocated for Mid examinations. In each semester two mid examinations to be conducted and the average of the two will be considered.
- I mid examination is to be conducted in offline mode at college level and II mid examination is to be conducted in online mode at department level.
- I mid examination to be conducted in offline mode in which the student should attempt **Two essay** questions for ten marks each out of three questions, **four short** answer questions with five marks each out of six questions.
- The remaining 20 marks for CIA are allocated as per the following structure.

Assignment- 10M	Seminar- 5M	Quiz -5M

13. Percentage of syllabus changes in each paper
14. Measure outcome attainment learning levels of students through direct and indirect methodology and mapping COs and POs
15. Text & Reference Books
16. e-content links.

The BoS meetings should be conducted as per the scheduled timelines given below.

S.No	Activity	Scheduled Date
1	Issuing notification for conduct of BoS meetings	23.04.2024
2	Pre BOS (Offline/Online)	25.04.2024
3	Departmental level curricula design	27.04.2024
4	Finalization of draft BOS	27-04-2024
5	Scrutiny by academic cell	29-04-2024
6	Correspondence with Subject experts, University nominees, Industrialists	28-04-2024
7	BOS for UG & PG	30-04-2024

PRINCIPAL
Pithapur Rajah's **Government**
Autonomous College
Kakinada

Enclosures: Annexures- I, II & III
Copy to:

Lecturers-in-Charge (BOS Chairmen) of all the departments
Academic Coordinator
IQAC coordinator
Controller of Examinations
Office

Vision and Mission of the college

Vision:

To provide the right academic environment paving way for intellectual excellence, humane feelings and social commitment. The college believes in providing quality education for the socially disadvantaged, economically weaker sections of the society and thereby help them move up the ladder of success and social order.

Mission:

- To impart holistic education with special emphasis on character, culture, updated knowledge and skill-oriented learning.
- To make the students enjoy the fruits of globalization without prejudice to their local and cultural environment.
- To impart necessary life skills so as to make them face any challenge in the bigger world – Social, ethical, psychological or professional.

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

BOARD OF STUDIES 2024-25

The Twentieth meeting of Board of Studies ***COMPUTER SCIENCE*** has been conducted in the Department of Computer Science on 30 APR, 2024 to discuss the following.

AGENDA

1. Department activities for 2024-25 academic year.
2. Organizing National/State level Seminars / Workshops / Conferences / /Training programmes etc., with topics and other details
3. Plan for organizing subject oriented community outreach programmes & allocation of necessary funds.
4. Any other programme that enhances the learning capacity of students and their employable & knowledge skills.
5. Suggest panel of examiners / paper setters & other experts / nominees for BOS deliberations.
6. Pedagogy implementation w.e.f. admitted batch 2024-25
7. Internal Assessment weight age 50% for I Year ,II Year and III Year students
8. End Semester Examinations for 50 marks for I Year, II Year and III year students.
9. Conduct practical examination semester wise for three years.
10. Encourage students to take-up certificate courses from AWS
11. IOT syllabus for I , II and III year students may be followed as framed by CCE AP
12. Any other issues with the permission of chair

RESOLUTIONS

The nineteenth meeting of Board of Studies ***COMPUTER SCIENCE*** has been conducted in the Department of Computer Science on 30th APR 2024 and adopted the following resolutions.

1. Program Specific Outcomes of Artificial Intelligence and IoT programmes discussed and approved.
2. Course Outcomes of Artificial Intelligence and IoT programme courses discussed and approved
3. Resolved to approve the curriculum, and academic activities of Artificial Intelligence and IoT programme for the academic year 2024-25.
4. Approved Blue Prints, Model Question Papers, and Question Banks for all UG Programs (I, II and III Years) in alignment with Bloom's Taxonomy
5. Approved Scheme of Evaluation for Internal and External Evaluation for I, II and III Years (50:50 pattern)
6. Resolved to approve Revised Panel of Question Paper Setters and Examiners
7. Resolved to approve department action plan-2024-25
8. The syllabus of new certificate course on Amazon web services discussed and approved
9. Approved the inclusion of additional inputs as necessary to each course for further extension of student knowledge
10. The resolution and approval have been made to divide the students of the department, with half undertaking apprenticeships during the V semester and the other half during the 6th semester.

DEPARTMENT OF COMPUTER SCIENCE

CONSOLIDATED REPORT OF BOARD OF STUDIES FOR THE YEAR 2024-2025

The board of studies meeting of computer science department was conducted on **30 April 2024** under the chairmanship of R.V .Satyanarayana Lecturer in –in-charge of Department of computer science the following members are present and approved the above resolutions

S.No	Name with Designation and Address	Designation	Signature
1	Sri. R.V.Satyanarayana In-Charge, Dept. of Computer Science P. R. Govt. College (A), Kakinada	Chair Person	30/04/2024
2	Smt. N. Nagasubramanyeswari Lecturer in Computer Science A.S .D.Govt degree college for women (A) , Kakinada	University Nominee	N.N.S.Eswari 30/04/2024
3	Sri .Dr. N Sridhar Lecturer in Computer Science Government Degree College, Tuni	Subject expert	30/04/2024
4	Sri. D. Suneel kumar Lecturer in Computer Science Govt. Degree College (A),Rajamhaendravaram	Subject expert	
5	Sri. P. S. R. Subrahmanyam, Rtd. HOD of Mathematics, Ideal College of Arts & Science (A), Kakinada	Alumni Member	
6	Sri A Sivakumar Developer TCS,Hyderabad	Industry Expert	
7	Miss. G Aneetha Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	
8	Sri Anantha teja Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	
9	Miss .K.Manisha Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	
10	Sri. P.Susmitha Lecturer in Computer Science P R Govt. College(A),Kakinada	Faculty of the Department	P.Susmitha

11	N.Durga bhavani	Parent Member	Durga Bhavani
12	B.Sai yaswanth	Student Member II B.SC-M.S.C.S	B.S Yaswanth
13	P.Lalitha kumari	Student Member II B.sc –M.S.C.S	P.Lalitha kumari
14	A.Syamala	Student Member II B.Sc –M.C.Cs	
15	D.Dhana Lakshmi	Student Member II B.sc –M.EIOT	D. Dhanalakshmi
16	T. Satish	Student Member II B.sc-M.E.C.S	T. Satish
17	R.N.Sivani	Student Member II B.Sc MPCS	R.N.Sivani
18	K. Chakravani	Student Member II B.sc AI	Chakravani
19	Aswitha lakshmi	Student Member I Bsc IOT	A. Aswitha Lakshmi

PANEL OF NAMES FOR APPOINTMENT OF EXAMINERS/PAPERSETTERS

2023-24

S.NO	NAME OF THE LECTURER	NAME OF THE COLLEGE
1	Dr. N Sridhar	GDC Tuni
2	Smt. Naga Subramanyeswari	ASD Women's College ,Kakinada
3	Sri. D.Suneel	G.D.C.(A), Rajamahendravaram
4	Sri RASMI RANJAN KHANSAMA	GDC TUNI
5	Dr. Ch. V. M. Hari	Dr VS Krishna G.D.C.(A), Visakhapatnnam
6	Sri. D. V. Raghava Swamy	Dr VS Krishna G.D.C.(A), Visakhapatnnam
7	Sri. BODALA RAVI	GDC Tuni
8	Sri. R Ashok Kumar	SCIM Govt. College, Tanuku
9	Sri. SSVAS Samba Murthy	GDC, Paderu
10	Dr. Jahnavi	VS Krishna College, VIsakhapatnam
11	Sri. E Jyothi Kiranmai	SCIM Govt. College, Tanuku
12	Sri. D Vijay Kumar	SCIM Govt. College, Tanuku
13	Smt. U Sandhya Rani	GDC(A), Rajahmundry
14	Sri H Devaraj	GDC(A), Rajahmundry
15	Sri P Narasinga Rao	GDC(A), Rajahmundry
16	Sri D Seeta Ramudu	GDC(A), Rajahmundry

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE(AUTONOMOUS), KAKINADA

DEPARTMENT OF COMPUTER SCIENCE
UNDER CBCS PATTERN

Courses for the Academic Year 2023-24

COURSE STRUCTURE OF B.Sc. (IoT)

S.No	Semester	Course Code	Titleofthe Course(Paper)	Max Marks(SEE)	Marks inCIA	Hrs/Week			
						L	T	P	C
1	SEM– I		Essentials and Applications of Mathematical, Physical and Chemical Sciences	50	50	3+2			4
2			Advances in Mathematical, Physical and Chemical Sciences	50	50	3+2			4
3	SEM- II		Fundamentals of Computer and C –Programming	50	50	--	3	-	3
4			C Programming Lab	50	--	-	-	2	1
5			Fundamentals of IoT and Applications	50	50	-	3	-	3
6			Arduino Programming Lab	50	--	-	-	2	1
7	Life Skill Course		Digital Literacy	50	--	2	--	--	2
			Phase – I CSP	100	--	--	--	--	4
8	SEM-III		Python for Data Science	50	50	3	--	-	3
9			Python for Data Science Lab	50	--	-	-	2	1
10			Data Communications and Computer networks	50	50	3	--	-	3
11			Network Simulator-2 Lab	50	--	--	--	2	1
12			Data Structures using 'C'	50	50	3	--	--	3
13			Data structures Lab	50	--	--	--	2	1
14			Digital Logic Design	50	50	3	--	--	3
15			Digital Logic Design Lab	50	--	--	--	2	1
16			Java Programming	50	50	3	--	-	3

17	SEM-IV		Java Programming Lab		50	--	-	-	2	1
18			Operating Systems		50	50	3	-	-	3
19			OS & UNIX programming Lab		50	--	--	--	2	1
20			Computer Organization & Architecture		50	50	3	-	-	3
21			Computer Organization &Architecture Lab		50	--	-	-	2	1
III BSC MEIOT-SYLLABUS W.E.F. 2020-21 AB										
1	SEM-V		6A: Machine Learning for IoT	Elective- A	50	50	3	1	-	3
2			Machine Learning for IoT Lab		50	--	-	-	3	2
3			7A: Computer Vision		50	50	3	1	-	3
4			Computer Vision Lab		50	--	-	-	3	2
5			6B: Java Programming for IoT	Elective- B	50	50	3			3
6			Java Programming for IoT Lab		50	0			3	2
7			7B: Big Data and Analytics		50	50	3			3
8			Big Data and Analytics Lab		50	0			3	2
9			6C: Web of Things	Elective-C	50	50	3			3
10			Web of Things Lab		50	0			3	2
11			7C: Security in IoT		50	50	3			3
12			Security in IoT Lab		50	0			3	2
SEMESTER VI – APPRENTICESHIP										

L=Lecture=Tutorial, P=Practical=Credits

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

BOARD OF STUDIES 2023-2024& 2022-23

Marks Distribution for the I Year, II Year & III year

Internal: 50 marks External: 50 marks

S.No.	Activities	Marks Allotted
1	Two Internal Mid Term Exams (Avg of two).. for 25marks	25 Marks
2	Project(10M), Viva voce(3M), Assignments(5M), seminars(5M),clean & green and attendance-(2M)	25 Marks
		Total - 50 Marks

P R GOVERNMENT COLLEGE [AUTONOMOUS] KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

B.SC PROGRAMME COURSE STRUCTURE IN COMPUTER SCIENCE 2024-25

SUMMARY OF CHANGES IN SYLLBUS

Semester	Title of the Course(Paper)	Changes
I	Essential and Applications of Mathematical, Physical and chemical sciences	NIL
I	Advances in Mathematical,Physical and chemical sciences	NIL
II	Fundamentals of Computers and C programming	NIL
II	Fundamentals of IoT and Applications	NIL
III	Python for Data sciences	NIL
III	Data Communications and Computer networks	NIL
III	Data Structures using 'C'	NEW COURSE
III	Digital Logic Design	NEW COURSE
IV	Java Programming	NIL
IV	Operating Systems	NEW COURSE
IV	Computer Organization & Architecture	NEW COURSE
V	Java Programming for IoT	NIL
V	Big data Analytics	NIL

Program Specific Outcomes (PSOs)

After completion of the program, the student is able to

PSO1: Experiment and prepare programming concepts and provide new ideas and innovations towards research and societal issues in the field of Internet of things.

PSO2: Analyses and develop computer systems connected together using IoT network protocols, and also work towards making them more secure and efficient using block chain, machine learning algorithms, fog and edge computing for efficient design of computer-based systems of varying complexity. Finally specify, design, develop, test and maintain usable systems that behave reliably and efficiently.

PSO3: Apply standard and advanced Internet of things-based concepts, practices and strategies in order to develop sustainable products using AI-based technology to deliver a quality product for home automation.

PSO4: Apply standard and advanced Internet of things-based concepts, practices and strategies in order to develop real time IOT devices.

B.Sc (Honours) with Single Major

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

SEMESTER-I

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester			
Course Code	**TITLEOFTHECOURSE** Essentials And Applications of Mathematical, Physical and chemical Sciences	I B.Sc. AI(I Sem.)			
Teaching	HoursAllocated:60(Theory)	L	T	P	C
Pre-requisites:		5		-	4

Course Objectives

1. The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. 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 in various 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 security concepts, including threats, vulnerabilities, and counter measures.

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

UNIT–II

ESSENTIALS OF PHYSICS:

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

UNIT–III

ESSENTIALS OF CHEMISTRY:

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

UNIT–IV

APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY:

Applications of Mathematics in Physics & Chemistry: Calculus, Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Auto motive and Aerospace Industries ,Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT–V

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

Text Books:

1. Functions of one complex variable by John. B. Conway, Springer-Verlag.
2. Elementary Trigonometry by H.S .Hall and S.R. Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd. 4.Basic Statistics by B.L .Agarwal, Newage international Publishers
4. Essentials And Applications Of Mathematical, Physical and chemical Sciences: HK Dass, PS Hemne, RL Madan, Rama Verma, Rajnish Verma, Suneel K Duvvuri.
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. JewettJr.
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 ,RyanOlson

WebLinks:

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

CO-POMapping:

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

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

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT	Short 5 M	Essay 10M	Weightage
1	I	2	2	30%
2	II	2	1	20%
3	III	1	1	15%
4	IV	1	1	15%
5	V	1	1	15%
		35	60	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

SEMESTER – I

Time: 2 Hours **Max Marks: 50M**

Section -I

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

Part – A

1. Long Answer Question 1
2. Long Answer Question 2
3. Long Answer Question 3

Part - B

4. Long Answer Question 4
5. Long Answer Question 5
6. Long Answer Question 6

Section II

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

7. Short Answer Question 7
8. Short Answer Question 8
9. Short Answer Question 9
10. Short Answer Question 10
11. Short Answer Question 11
12. Short Answer Question 12
13. Short Answer Question 13

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester			
Course Code	**TITLEOFTHECOURSE** **Advances In Mathematical, Physical and Chemical Sciences**	I B.Sc. AI(I Sem)			
Teaching	HoursAllocated:60(Theory)	L	T	P	C
Pre-requisites:		5		-	4

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. 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.

Syllabus

UNIT–I

Straight Lines: Different forms – Reduction of general equation into various forms –Point of inter section of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule

Integration: Integration as are verse process of differentiation–Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices –Transpose of a matrix and determinants

UNIT–II

Renewable energy: Generation, energy storage, and energy-efficient materials and devices.

Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication-recent advances in biophysics-recent advances in medical physics-Shape Memory Materials.

UNIT–III

ADVANCESINCHEMISTRY:

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

UNIT–IV

ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY

Mathematical 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.

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.

Text Books:

1. Coordinate Geometry by S.L.Lony ,Arihant Publications
2. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
3. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
4. "Energy Storage: A Nontechnical Guide" by Richard Baxter
5. Advances of Mathematical, Physical and Chemical Sciences: HK Dass, PS Hemne, RL Madan, Rama Verma, Rajnish Verma, Suneel K Duvvuri.
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

WebLinks:

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

CO-POMapping:

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

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

Model Blue print for the question paper setter

BLUE PRINT				
S.No.	UNIT	Short 5 M	Essay 10M	Weightage
1	I	2	2	30%
2	II	2	1	20%
3	III	1	1	15%
4	IV	1	1	15%
5	V	1	1	15%
		35	60	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

SEMESTER – I

Time: 2 Hours **Max Marks: 50M**

Section -I

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

Part – A

1. Long Answer Question 1
2. Long Answer Question 2
3. Long Answer Question 3

Part - B

4. Long Answer Question 4
5. Long Answer Question 5
6. Long Answer Question 6

Section II

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

7. Short Answer Question 7
8. Short Answer Question 8
9. Short Answer Question 9
10. Short Answer Question 10
11. Short Answer Question 11
12. Short Answer Question 12
13. Short Answer Question 13

Semester-II

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester I B.Sc. M.E.IoT (II Sem)			
Course Code	**TITLE OF THE COURSE** Fundamentals of Computer and C- Programming				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Computer knowledge	3	1	-	3

Course Objectives:

1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn basic constructs of computer programming languages
4. Learn data types and control structures of C
5. Learn to map problems to programming features of C.
6. 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 computers - Characteristics and limitations of computer, Block diagram of computer, types of computers, computer generations. Number systems: binary, hexadecimal

and octal numbering system. **Input and output devices**: Keyboard and mouse, inputting data in other ways **Types of Software**: system software, Application software, commercial, open source, domain and free ware software, Memories: primary, secondary and cache memory.

UNIT-II

Problem Analysis **and its Tools:** Problem solving technique and Program Development Life Cycle, Problem Definition, Algorithm, Flow Charts, Types of Errors, Testing and Debugging. **Basics of C:** Historical development of C Language, Basic Structure of C Program, C Character Set, Identifiers and Keywords, constants, variables, Data types. **Operators and expressions:** Arithmetic, Relational, Logical, Assignment, Unary, Conditional and Bitwise operators. Type conversions. **Input and output statements:** getchar( ), getch( ), getche( ), putchar( ), printf( ), scanf( ), gets( ),puts( )

UNIT-III

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. Arrays: one dimensional Array, two dimensional arrays. Strings: Input/ Output of strings, string handling functions, table of strings

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.

UNIT-V

Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic. Pointers and arrays, pointers and functions. **Structures and Unions: Using** structures and unions, use of structures in arrays and arrays in structures. Comparison of structure and Union.

Text Books:

1. E. Balagurusway, ―Programming in C‖, Tata McGrwal Hill.
2. Computer fundamentals and c programming in c by Reemathareja, oxford university press

Reference Books

1. Introduction to C programming by REEMA THAREJA from OXFORD UNIVERSITYPRESS
2. E Balagurusamy: ―COMPUTING FUNDAMENTALS & C ROGRAMMING – TataMcGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
4. Henry Mullish&HuubertL.Cooper: The Spirit of C An Introduction to modern Programming,Jaico Pub. House,1996.
5. Y kanithkar, let us C BPB, 13 th edition-2013, ISBN:978-8183331630,656 pages.

WebLinks:

1. https://nptel.ac.in/courses/106/105/106105171/
2. https://www.programiz.com/c-programming

P R GOVT COLLEGE (A):: KAKINADA

DEPARTMENT OF COMPUTER SCIENCE

I IOT MAJOR -SEMESTER-II

Paper-II: Fundamentals of Computer and C- Programming

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

SECTION –I

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

Part-A

1. Demonstrate the Block diagram of computers?-BT2
2. Delineate the Generations of the computer? –BT3
3. Define operator? Demonstrate the Different types of operators in c?-BT1+BT2

Part-B

4. Demonstrate conditional/ selection statements in C ? – BT2
5. Discuss the functions and types of functions in C? –BT1
6. What the Pointer? Demonstrate Types of pointers?-BT1+BT2

SECTION - II

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

7. List in Types of Software? –BT1
8. What is Identifier? Explain with example. –BT1
9. Define is switch statement? Write its syntax? –BT1
10. Discuss about Break and continue? –BT1
11. Explain storage classes in C-BT2
12. Discuss the Dynamic memory allocation in pointers? -BT1
13. Explain about pointer data types? - BT2

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

MODEL BLUE PRINT FOR MODULE_WISE FOR THE YEAR 2023-2024

I IOT MAJOR 2023-2024 BATCH

Computer Science Course: Fundamentals of Computer and C- Programming

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

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted tothe chapter
UNIT-1	2	1	25
UNIT-2	1	2	20
UNIT-3	1	2	20
UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterI B.Sc. IOT (II Sem)			
Course Code **IoT103P**	**TITLE OF THE COURSE** Hardware and C Programming Lab				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	Basic Computer Knowledge	0	0	2	1

Objectives:

1. To aim of this lab course is to equip the students with Basic Hardware and ProgrammingSkills.

List of Experiments

Hardware Lab:

1. Identify various Memory components of the Computer.
2. Identify Various Cables and their uses
3. Identify various Network Devices.
4. Assembling and Disassembling of Computers.

C Programming Lab

1. Find the biggest of three numbers using C.
2. Write a c program to find the sum of individual digits of a positive integer.
3. 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.
4. Write a c program to check whether a number is Armstrong or not.
5. Write a program to perform various string operations.
6. Write a c program to generate all the prime numbers between 1 and n, where n is a valuesupplied by the user.
7. Write a c program that uses functions to perform the following: Addition of two matrices.Multiplication of two matrices.
8. Write a c program that implements searching of given item in given list.
9. Write a c program to sort a given list of integers in ascending order.
10. Write a c program to perform various operations using pointers.
11. 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.
12. Write a program for concatenation of two strings.
13. Write a program for length of a string

Referencebooks:

1. Computer fundamentals and c programming in c by Reemathareja, oxford university press

Virtual LabLinks:

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

2. http://ps-iiith.vlabs.ac.in/

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester I B.Sc.IoT (II Sem)			
Course Code	TITLE OF THE COURSE Fundamentals of IoT and Applications				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Computer hardware	3	1	-	3

Course Objectives

1. To study fundamental concepts of IoT
2. To understand roles of sensors in IoT
3. To Learn different protocols used for IoT design
4. To be familiar with data handling and analytics tools in IoT
5. Appreciate the role of big data, cloud computing and data analytics in a typical IoT system.
6. Understand the role of IoT in various domains of Industry.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the various concepts, terminologies and architecture of IoT systems.
CO2	Use sensors and actuators for design of IoT.
CO3	Understand and apply various protocols for design of IoT systems
CO4	Use various techniques of data storage and analytics in IoT
CO5	Understand various applications of IoT
CO6	Understand APIs to connect IoT related technologies

Syllabus:

UNIT-I :

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

UNIT-II:

Sensors Networks : Definition, Types of Sensors, Types of Actuators, Examples and Working,

IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT

UNIT-III

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC,Z-Wave, BLE, Bacnet, Modbus.

IP Based Protocols for IoT : IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT. Edge connectivityandprotocols

UNIT-IV

Data Handling& Analytics: Introduction, Bigdata, Types of data, Characteristics of Big data, Data handling Technologies, Flow of data, Data acquisition, Data Storage, Introduction to Hadoop. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications

UNIT-V

Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

Text Books:

1. HakimaChaouchi, — —The Internet of Things Connecting Objects to the Web‖ ISBN : 978-1-84821-140-7, Wiley Publications
2. Olivier Hersent, David Boswarthick, and Omar Elloumi, — —The Internet of Things: Key Applications and Protocols‖, WileyPublications
3. Vijay Madisetti and ArshdeepBahga, — —Internet of Things (A Hands-on-Approach)‖, 1st Edition, VPT, 2014.
4. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.
5. Keysight Technologies, —The Internet of Things: Enabling Technologies and Solutions for Design and Test‖, Application Note, 2016.

References Books

1. Daniel Minoli, — —Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications‖, ISBN: 978-1-118-47347-4, Willy Publications
2. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press

Web Links:

1. https://onlinecourses.nptel.ac.in/noc17_cs22/course
2. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

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
CO1													
CO2													
CO3													
CO4													
CO5													

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-1	2	2	30
UNIT-2	1	2	20
UNIT-3	1	1	15
UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE (AUTONOMOUS), KAKINADA

(Accredited by NAAC "A+" Grade)

DEPARTMENT OF COMPUTER SCIENCE

PAPER – II: IoT106: **Fundamentals of IoT andApplications**

MODEL QUESTION PAPER (W.E.F 2022-2023)SEMESTER – II

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

SECTION – I

Answer any three of the following questions. Must attempt atleast one question from each part .Each question carries 10 Marks.

(3x10=30M)

Part-A

1. What is IoT? Explain characteristics of IoT?
2. Explain the architecture of IoT?
3. Explain the types of actuators with example?

Part-B

4. What is edge connectivity? Write its applications
5. Explain Hadoop in detail
6. Write the role of IoT in home automations &health and life cycle?

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. Write the history of IoT?
8. Explain the role of internet in Iot?
9. What is RFID? Explain its components?
10. Explain about networking nodes?
11. Explain about z-wave?
12. Explain descriptive analytics?
13. Explain working of IoT in Logistics?

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterI B.Sc. IoT (II Sem)			
Course Code	**TITLE OF THE COURSE** Arduino Lab				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	Java Lab	0	0	3	2

Objectives:

1. To aim of this lab course is to provide hands on experience to the students with ArduinoMicroController

List of Experiments

1. Understanding Arduino UNO Board and Components
2. Installing and work with Arduino IDE
3. Blinking LED sketch with Arduino
4. Simulation of 4-Way Traffic Light with Arduino
5. Using Pulse Width Modulation
6. LED Fade Sketch and Button Sketch
7. Analog Input Sketch (Bar Graph with LEDs and Potentiometre)
8. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
9. Working with Adafruit Libraries in Arduino
10. Spinning a DC Motor and Motor Speed Control Sketch
11. Working with Shields
12. Interfacing Arduino with Cloud (Thingspeak API)

Referencebooks:

1. Arduino: A Technical Referenceby J. M. Hughes

Virtual LabLinks:

1. https://www.tinkercad.com/

SEMESTER -III

	Pithapur Rajahs Government College(A) Kakinada	Program & Semester I B.Sc. IOT (III Sem.)			
Course Code	**TITLE OF THE COURSE** PYTHON FOR DATA SCIENCE				
Teaching	Hours Allocated:45(Theory)	L	T	P	C
Pre-requisites:	Should have computer knowledge	3		-	3

Course Objectives:

1. The objective of this course is to study main elements of python programming and perform data analysis using data structures and tools in python.

Course Outcomes:

On Completion of this course, the students will be able to-	
CO1	To Understand Features and basic concepts of python.
CO2	To learn control structures in python and apply them to real world problems.
CO3	To implement functions and modules in python.
CO4	To understand data structures in python oops concepts
CO5	To construct data and perform data analysis.

Syllabus

UNIT-I

Basics of Python

Features of python, literal constants-numbers, variables, identifiers, data types, input operation, comments, operators, operations on strings, other data types, type conversion. Selection or conditional branching statements-if, if else, nested if, if elif else, loops or iterative statements- while, for, nested loops, break, continue, pass, else statement with loops.

UNIT-II

Functions and Modules

Functions-Definition and call, return statements, anonymous function-LAMBDA, recursive functions. **Modules-** Using existing modules, making own modules, packages in python, Names of standard library modules.

UNIT-3

Data Structures

List-Accessing lists, updating lists, nested lists, basic list operations, list methods, loops in lists.

Tuples -Creation, Accessing, updating, deletion in tuples and basic tuple operations.

Sets- creation, set operations.

Dictionaries-creation, accessing, adding and modifying items , deleting items.

UNIT-4

Object Oriented Programming concepts:

Oops concept-

Introduction, Classes and Objects, Class method Inheritance Introduction Inheriting classes in python Types of Inheritance, Error and Exception Handling

UNIT-5

Data Analysis:

Data preparation using pandas and series: pandas data frame basics**,** Creating your own data, Series, Data frames, Making changes to series and data frames

Plotting: Matplotlib Introduction, Univariate plots-Histograms

Textbooks:

1. **PythonProgrammingUsingProblemSolvingApproach**–ReemaTharej'aOxfordUniversityPress,©2017
2. **Pandas for Everyone(Python data Analysis)-** Daniel Y.Chen, Pearson Addison Wesley Data and Analyticsseries,©2018

Referencebooks:

1. **Python Programming Using Problem Solving Approach**–Reema Thareja, Oxford University Press, ©2017
2. **Pandas for Everyone (Python data Analysis)-**Daniel Y.Chen, Pearson Addison Wesley Data and Analytics series,©2018

WebLinks:

1. https://onlinecourses.nptel.ac.in/noc20_cs83/preview

CO-POMapping:

(1: Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':NoCorrelation)

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

Model Blue print for the question paper setter

Blue Print				
S.No.	UNIT	Short 5 M	Essay 10M	Weightage
1	I	2	2	30%
2	II	2	1	20%
3	III	1	1	15%
4	IV	1	1	15%
5	V	1	1	15%
		35	60	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
Program & Semester: II B.Sc. IOT(III Sem.)
PYTHON FOR DATA SCIENCE Model paper
SEMESTER – III
Time: 2 Hours Max Marks: 50M

Section -I

Answer any three of the following questions. Must attempt atleast one question from each part.

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

Part – A

1. Demonstrate python loop/Iterative statements BT2

2. What is the lambda function? Write the characteristics of a lambda function. BT1

3. Explain the concept of classes and objects in Python. Provide an example demonstrating the creation of a class and instantiation of objects. BT1+BT2

Part - B

4. Describe the features of python. BT1

5. What is dictionary? Explain the methods available in dictionary. BT1

6. Explain how Data Frames organize data and facilitate operations such as filtering, aggregation, and visualization. BT1

Section II

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

7. Describe type conversion in python BT1

8. Demonstrate python data types BT2

9. Define function in python and state its advantages BT1

10. Design a program using functions to swap two numbers. BT3

11. Differentiate between list and tuple in python BT1

12. Demonstrate the role of constructors in Python classes. BT2

13. Explain the fundamental components and functionality of Pandas Data Frames. BT1

PYTHON FOR DATA SCIENCE LAB

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Implement a given problem as a python program.
CO2	To write loops and decision statements in Python
CO3	To implement functions and modules in Python.
CO4	To implement different data structures in python
CO5	To implement data analysis using pandas and graphs

Lab Experiments:

1. Write a program to read and print values of variables of different data types.
2. Write a program to find the roots of quadratic equations.
3. Write a program of in the largest of 3 numbers.
4. Write a program to check whether a given number is prime or not.
5. Write a program to generate Fibonacci series.
6. Write a program to find whether a given number is Armstrong or not.
7. Write a program using functions to swap two numbers.
8. Write a program to find factorial of a number using recursion.
9. Write a program to find square root of a given number using math module.
10. Write a program to generate 10 random numbers between 1to100 using random module.
11. Create a list and perform different operations on it.
12. Create a tuple and perform different operations on it.
13. Create a set and perform different operations on it.
14. Create a dictionary and perform different operations on it.
15. Import p and as and create a data frame and perform operations on it.
16. Generate histogram using Mat plot lib.
17. Generate scatter plot using Mat plot lib.
18. Generate box plot using Mat plot lib.

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	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	**TITLE OF THE COURSE** Data Communications & Computer Networks	II B.Sc(IoT) (III Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic computer knowledge	3	1	-	3

Course Objectives:

1. Appreciate the use of computer networking in various walks of life, describe the types of networks, network configurations and network topologies. Also Write the OSI and TCP/IP reference models for networking.
2. Responsibilities of data link layer, its implementation and associated protocols, algorithms/pseudo codes.
3. The various techniques used to access a shared channel in the network and IEEE specifications for LANs.
4. Networking devices, backbone networks and Internet Protocol (IP) addressing.
5. Responsibilities of network, transport and application layers.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	computer networks, list network configurations, types, topologies, the applications of computer networks in different fields, network models and description of physical layer.
CO2	Reason the need for flow and error control at the data link layer and explain the associated protocols.
CO3	Enumerate the shared channel access methods, associated protocols and Wired & Wireless LAN standards and implementations.
CO4	the types of networking devices / equipment and also explain the addressing scheme used at the network layer.
CO5	how network layer, transport layer and application layer facilitates the transfer of message from one node to another in a global network

Syllabus:

UNIT – I

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

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

TCP/IP Reference Models, addressing.

UNIT – II

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

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

UNIT – III

Multiple Accesses, Random Access: ALOHA, Carrier Sense Multiple Access (**CSMA**) Protocols, CSMA with Collision Detection, CSMA with Collision Avoidance.

Controlled Access: Reservation, Polling and Token Passing. **Channelization:** FDMA, TDMA, CDMA. **Wired LAN:** Ethernet, IEEE standards, Standard Ethernet. Changes in the standards, Fast Ethernet, Gigabit Ethernet, Wireless LAN (802.11).

UNIT – IV

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

UNIT – V

Network Layer: Delivery, Forwarding, Types of Routing protocols, Unicast Routing Protocols.

The Transport Layer: Process to process Delivery, User Datagram Protocol (UDP) and TCP.

Application layer: Domain name space, Distribution of name space, Resolution.

Text Books:

1. Data communications and Networking-4th edition BeharouzA.Forouzan, TMH

Reference Books:

1. Data Communications and Computer Networks By Prakash C. Gupta, PHI Publishers.
2. Computer Networks By Andrew S.Tanenbaum, Pearson Education.
3. Wireless Technologies Circuits, Systems and Devices by Krzysztof Iniewski CRC Press.
4. Wireless Networking Technology: From Principles to Successful Implementationby Stephen A. Rackley

WebLinks:

1. https://nptel.ac.in/courses/106/105/106105082/
2. https://nptel.ac.in/courses/117/105/117105076/

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
CO 1													
CO 2													
CO 3													
CO 4													
CO 5													

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-1	**2**	**1**	**25**
UNIT-2	**1**	**2**	**20**
UNIT-3	**1**	**2**	**20**
UNIT-4	**1**	**1**	**15**
UNIT-5	**1**	**1**	**15**
Total No. of questions	**6**	**7**	
Total Marks Including choice			**95**

PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA

II B.Sc –IOT / Semester- III

Course: Data Communications & Computer Networks

SEMISTER – III MODEL QUESTION PAPER

SECTION – I

Answer any three of the following questions. Must attempt at least one question from each part. Each question carries 10 Marks. 3X10=30M

Part-A

1. Explain the functions of various layers OSI model? [BT1]
2. Demonstrate various network topologies in computer network [BT2]
3. Explain GO-BACK-N-ARQ with neat diagram? [BT1]

Part-B

4. What is random access? Justify CSMA/CD protocols how much needed in Data transmission. [BT 4]
5. What is a network? Explain back-bone networks [BT 1]
6. What is TCP and UDP? Compare TCP and UDP with example? [BT2]

SECTION-II

Answer any four of the Following questions. Each question carries 5 Marks 4x5=20m

7. Demonstrate various types of networks [BT2]
8. Classify transmission impairment [BT2]
9. What is framing? Determine what is the need for framing? [BT1&2]
10. Explain difference between FDMA & CDMA [BT2]
11. Explain about transition from IPv4 to IPv6 [BT1]
12. Demonstrate types of routing protocols [BT 2]
13. Illustrate TCP/IP utilities? [BT1]

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	DATA STRUCTURES USING 'C'	II B.sc Major (III Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic programming	3	1	-	3

Course Objectives:

- The objective of the course is to Introduce the fundamental concept of data structures and abstract data types
- Emphasize the importance of data structures in developing and implementing efficient algorithms
- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs arerepresented in memory and used by algorithms

Course Outcomes:

- After completing this course a student will be able to: Summarize the properties, interfaces, and behaviors of basic abstract data types
- Discuss the computational efficiency of the principal algorithms for sorting &searching Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
- Demonstrate different methods for traversing trees

UNIT I: Data Structures - Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), and Preliminaries of algorithms. Time and Space complexity. **Searching**- Linear search, Binary search. **Sorting**- Insertion sort, Selection sort, Bubble sort, quick sort, merging (Merge sort) algorithms.

UNIT II Linked List: Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list-Insertion, Deletion, Search and Traversal ,Reversing Single Linked list, Applications on Single Linked list- Sparse Matrix Representation using Linked List, Advantages and Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.

UNIT III Queues & Stacks: Introduction to Queues, Representation of Queues-using Arrays and using Linked list, Implementation of Queues-using Arrays and using Linked list, Application of Queues-Circular Queues, Deques, Priority Queues. **Stacks:** Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Linked list Representation of Stacks,

Operations on Linked Stack, Applications- Infix to Postfix Conversion, Evaluating Postfix Expressions.

UNIT IV Trees: Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees using Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Balanced Binary Trees AVL Trees, Insertion, Deletion and Rotations.

UNIT V Graphs: Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims &Kruskals Algorithm,Dijkstra's shortest path, Transitive closure, Warshall's Algorithm.

Text Books:

1. Data Structures Using C. 2ndEdition.ReemaThareja, Oxford.
2. Data Structures andalgorithm analysis in C, 2nded, Mark Allen Weiss.

Reference Books:

1. Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Sahni,Universities Press
2. Data Structures: A Pseudo Code Approach, 2/e, Richard F.Gilberg, BehrouzA. Forouzon, Cengage.
3. Data Structures with C, Seymour LipschutzTMH

e-Resources:

1. http://algs4.cs.princeton.edu/home/
2. https://faculty.washington.edu/jstraub/dsa/Master_2_7a.pdf

MODEL BLUE PRINT FOR QUESTION PAPER SETTER

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted tothe chapter
UNIT-1	2	1	25
UNIT-2	1	2	20
UNIT-3	1	2	20
UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
Program & Semester: II B.Sc. AI (III Sem.)

DATA STRUCTURES USING Model paper
SEMESTER – II
Time: 2 Hours Max Marks: 50M

Section -I

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

Part – A

1. What is Abstract Data Type (ADT)? How does an Abstract Data Type (ADT) simplify the use of data structures, and why is it important in software development?
2. What is a queue? Describe how a queue can be implemented with an array?
3. Describe Prim's algorithm for finding a Minimum Spanning Tree (MST). Provide a step-by-step example of how it works.

Part – B

4. Define data structure. Explain different types of data structure
5. Describe the process of adding a new node to a single linked list in three different scenarios: at the start, at an arbitrary position, and at the end.
6. Explain the procedure for deleting a node from a binary search tree. Discuss the different cases that need to be handled during deletion.

Section II

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

7. Explain the difference between linear and non-linear data structures with examples
8. Describe the traversal operation in a single linked list. Why is it important?
9. List advantages and disadvantages of using a single linked list
10. Define a priority queue and what are its typical applications?
11. Explain the process of pushing and popping elements in a stack implemented with a linked list.
12. What is a binary search tree (BST)? Explain its key properties
13. Explain the following terms

    i. Vertex (or node) **ii. Edge** **iii. Degree** **iv. Path**

    v. Subgraph

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterII B.sc Major (III Sem.)			
Course Code	DATA STRUCTURES USING 'C' Lab				
Teaching	Hours Allocated: 30 (Theory)	L	T	P	C

Pre-requisites:	C programming	-	-	2	1

1. Write a program to read ‘n’ numbers of elements into an array and insert an element in specified position of that array.
2. Write a program to search an item in a given list using the following Searching algorithms
    a. Linear Search b. Binary Search.
3. Write a program for the implementation of Bubble Sort
4. Write a program for the implementation of Insertion Sort
5. Write a program for the implementation of Quick Sort
6. Write a program for the implementation of Merge Sort
7. Write Programs to implement the Stack operations using an array
8. Write a program using stacks to convert an infix expression to postfix
9. Write a program to implement the Stack operations using Liked List.
10. Write a program to implement the Queue operations using an array.
11. Write a program to implement the Queue operations using Liked List.
12. Write a program for Binary Search Tree operations
13. Write a program to implement Depth First Search graph traversals algorithm
14. Write a program to implement Breadth First Search graph traversals algorithm

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester II B.sc Major (III Sem)			
Course Code	DIGITAL LOGIC DESIGN				
Teaching		L	T	P	C
		---	3	2	4

Course Objective

- To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, theory of Boolean algebra and map method for minimizationof switching functions.
- To introduce the basic tools for design of combinational and sequential digital logic.
- To learn simple digital circuits in preparation for computer engineering.

UNIT- I: Digital Systems and Binary Numbers

Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction, 4-bit codes: BCD, EXCESS 3, alphanumeric codes, 9's complement, 2421, etc..

UNIT -II: Concept of Boolean algebra

Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms.

Gate level Minimization

Map Method, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function.

UNIT- III: Combinational Logic

Introduction, Analysis Procedure, Binary Adder–Subtractor, Binary Multiplier, Decoders, Encoders, Multiplexers, Demultiplexers, Priority Encoder, Code Converters, Magnitude Comparator, HDL Models of Combinational Circuits.

Realization of Switching Functions Using PROM, PAL and PLA.

UNIT- IV: Synchronous Sequential Logic

Introduction to Sequential Circuits, Storage Elements: Latches, Flip-Flops, RS- Latch Using NAND and NOR Gates, Truth Tables. RS, JK, T and D Flip Flops, Truth and Excitation Tables, Conversion of Flip Flops.

UNIT -V: Registers and Counters

Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter.

OUTCOMES:

A student who successfully fulfills the course requirements will have demonstrated:

- An ability to define different number systems, binary addition and subtraction, 2'scomplement representation and operations with this representation.
- An ability to understand the different switching algebra theorems and apply them for logicfunctions.
- An ability to define the Karnaugh map for a few variables and perform analgorithmic reduction of logic functions.
- Students will be able to design various logic gates starting from simple ordinary gatesto complex programmable logic devices & arrays.
- Students will be able to design various sequential circuits starting from flip-flop to registers and counters.

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.
2. Digital Logic Design, Leach, Malvino, Saha, TMH.
3. Modern Digital Electronics, R.P. Jain, TMH.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

MODEL BLUE PRINT FOR MODULE WISE FOR THE YEAR
2024-2025
II B.SC(IoT) 2024-2025 BATCH

DIGITAL LOGIC DESIGN
SEMESTER-III

Time:2.30Hrs **Max Marks:50**

Model Blueprint for the Question paper setter

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

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

2024-2025
II B.SC(IoT) 2024-2025 BATCH

DIGITAL LOGIC DESIGN
SEMESTER-III
MODEL QUESTION PAPER

Time:2.30Hrs **Max Marks:50**

SECTION-A

Answer any three from the following atleast one question from the each part 3X10=30M

PART-I

1. Describe the process of arithmetic addition and subtraction in binary systems. Discuss any challenges or limitations associated with these operations.
2. Compare and contrast different 4-bit codes such as BCD, EXCESS 3, and alphanumeric codes. Discuss their applications and advantages.
3. Explain the basic theorems and properties of Boolean algebra. How are these principles applied in digital circuit design?

PART-II

4. Describe the basic components of combinational logic circuits. Explain the analysis procedure for designing such circuits.
5. Discuss the truth tables and excitation tables of various flip-flops. Explain how they are used in the design and analysis of sequential circuits.
6. Describe the operation of shift registers and their applications in digital systems. Discuss different types of shift registers.

SECTION-B

Answer any **FOUR** from the following 4X5=20M

7. What are signed binary numbers? How are they represented and manipulated in digital systems?
8. What are the differences between binary, octal, and hexadecimal numbers? Provide examples for each conversion.
9. Define Boolean functions and discuss the importance of canonical and standard forms in Boolean algebra.
10. Explain the concept of Priority Encoder. How is it used in digital systems?
11. Compare and contrast different methods of gate-level minimization such as Products of Sum Simplification and Sum of Products Simplification.
12. Define a shift register. How is it different from a standard register?
13. Define the term "register" in the context of digital systems. How is a register different from a counter?

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

2024-2025
II B.SC(IoT) 2024-2025 BATCH
SEMESTER III

DIGITAL LOGIC DESIGN LAB

COURSE OBJECTIVES:

The objectives of this course are to:

- Introduce the concept of digital and binary systems.
- To know the concepts of Combinational circuits.
- Be able to design and analyze Sequential logic circuits.
- To understand the concepts of flip-flops, registers and counters.
- Students will learn and understand the basics of logic gates and circuits.

COURSE OUTCOMES:

- A student who successfully fulfils the course requirements will have demonstrated:
- CO1: To learn about the basics of gates.
- CO2: To understand, analyse and design the basic digital circuits and any digital design in real
- time applications.
- CO3: Construct basic combinational circuits and verify their functionalities.
- CO4: Apply the design procedures to design basic sequential circuits.
- CO5: An ability to measure and record the experimental data, analyse the results, and preparea formal laboratory report.

List of Experiments:

1. Verification of Basic Logic Gates.
2. Implementing all individual gates with Universal Gates NAND & NOR.
3. Design a circuit for the given Canonical form, draw the circuit diagram and verify the De-Morgan laws.
4. Design a Combinational Logic circuit for 8x1 MUX and verify the truth table.
5. Verify the data read and data write operations for the IC 74189.
6. Construct Half Adder and Full Adder using Half Adder and verify the truth table.
7. Design a 4-bit Adder/Subtractor.
8. Design and realization of 4-bit comparator.
9. Design and implement a 3 to 8 decoder using gates.
10. Design and realization of a 4-bit Gray to Binary and Binary to Gray converter.
11. Implementation of Master Slave Flip-Flop with J-K Flip- Flop and verify the truth table for race aroundcondition.
12. Design a Decade Counter and verify the truth table.
13. Design and implement a 4-bit shift register using Flip flops.
14. Design and Verify the 4-bit synchronous.
15. Design and verify 4-bit ripple counter (Asynchronous).

TEXT BOOKS:

1. Digital Design ,4/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.
3. Digital Logic Design, Leach, Malvino, Saha,TMH.

REFERENCES:

1. Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
2. Verilog HDL primer, Jaya Bhaskar, PEA.
3. Modern Digital Electronics, R.P. Jain, TMH.

Digital Fundamentals, Thomas L. Floyd, Pearson Education, ISBN:9788131734483

SEMESTER -IV

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester B.sc Major (IV Sem)			
Course Code	**JAVA PROGRAMMING**				
Teaching		L	T	P	C
		---	3	2	4

Course Objectives:

The learning objectives of this course are:

- To identify Java language components and how they work together in applications
- To learn the fundamentals of object-oriented programming in Java, including definingclasses, invoking methods, using class libraries.
- To learn how to extend Java classes with inheritance and dynamic binding and how to useexception handling in Java applications
- To understand how to design applications with threads in Java
- To understand how to use Java APIs for program development

Course Outcomes:

By the end of the course, the student will be

- Able to realize the concept of Object-Oriented Programming & Java ProgrammingConstructs
- Able to describe the basic concepts of Java such as operators, classes, objects, inheritance,packages, Enumeration and various keywords
- Apply the concept of exception handling and Input/ Output operations
- Able to design the applications of Java & Java applet
- Able to Analyze& Design the concept of Event Handling and Abstract Window Toolkit

UNIT I

Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators :Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final, Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if–else Expressions, Ternary Operator? Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested forLoop, for–Each for Loop, Break Statement, Continue Statement.

UNIT II

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this. Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

UNIT III

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors.

Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Function a Interfaces, Annotations.

UNIT IV

Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs,Path and Class Path, Access Control, Packages in Java SE, Java. Lang Package and its Classes, Class Object,Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto- unboxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw,try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, CheckedExceptions, try-with-resources, Catching Subclass Exception, Custom Exceptions, Nested try and catch Blocks, Rethrowing Exception, Throws Clause.

UNIT V

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Methods for Comparison of Strings, Methods for Modifying Strings, Methods for Searching Strings, Data Conversion and Miscellaneous Methods, Class String Buffer, Class StringBuilder. Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread- Creation of New Threads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.
Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J,JDBC Environment Setup, Establishing JDBC Database Connections, ResultSet Interface, Creating JDBC Application, JDBC Batch Processing, JDBC Transaction Management

Text Books:

1) JAVA one step ahead, Anitha Seth, B.L.Juneja,Oxford.
2) The complete Reference Java, 8th edition, Herbert Schildt,TMH.
3) JAVA Programming for Core and Advanced Learners, Sagayaraj, Denis, Karthik, Gajalakshmi, Universities Press.

References Books:

1) Introduction to java programming, 7th edition by Y Daniel Liang,Pearson

2) Constructive JAVA Programming, Sagayaraj, Denis, Karthik, Gajalakshmi, UniversitiesPress.

e-Resources:

1) https://nptel.ac.in/courses/106/105/106105191/
2) https://www.w3schools.com/java/java_data_types.asp

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

MODEL BLUE PRINT FOR MODULE WISE FOR THE YEAR
2024-2025
II B.SC(IoT) 2024-2025 BATCH

JAVA PROGRAMMING
SEMESTER-III

Time:2.30Hrs **Max Marks:50**

Model Blueprint for the Question paper setter

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

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

2024-2025
II B.SC(IoT) 2024-2025 BATCH

JAVA PROGRAMMING
SEMESTER-IV
MODEL QUESTION PAPER

Time:2.30Hrs **Max Marks:50**

SECTION-A

Answer any three from the following atleast one question from the each part 3X10=30M

PART-I

1. Explain the significance of command line arguments in Java programs. Provide examples to illustrate their usage.
2. Discuss the importance of programming style in Java. How does adhering to a consistent style enhance code readability and maintainability?
3. Describe the concept of access control for class members in Java. How does encapsulation enhance the security and integrity of Java programs?

PART-II

4. Explain the process of dynamic change of array size in Java. Provide an example demonstrating the resizing of an array.
5. Explain the importance of exception handling in Java programs. Discuss the hierarchy of standard exception classes in Java.
6. Discuss the difference between String, StringBuffer, and StringBuilder classes in Java. Provide scenarios where each class is preferred.

SECTION-B

Answer any FOUR from the following **4X5=20M**

7. What are escape sequences in Java? Provide three examples.
8. Explain the difference between static variables and instance variables in Java.
9. What is method overloading? Provide an example demonstrating method overloading in Java.
10. What is the significance of the keyword "this" in Java? Provide a scenario where its usage is necessary.
11. What is the difference between abstract classes and interfaces in Java?
12. What is auto-boxing and auto-unboxing in Java? Provide an example demonstrating their usage.
13. What is multithreading in Java? Explain the difference between process-based and thread-based multitasking.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

2024-2025
II B.SC(IoT) 2024-2025 BATCH
SEMESTER IV

JAVA PROGRAMMING LAB

Course Objectives:

The aim of this lab is to

- Practice programming in the Java
- Gain knowledge of object-oriented paradigm in the Java programming language
- Learn use of Java in a variety of technologies and on different platforms

Course Outcomes:

By the end of the course student will be able to write java program for

- Evaluate default value of all primitive data type, Operations, Expressions, Control-flow,Strings
- Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, Userdefined Exception handling mechanism
- Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
- Construct Threads, Event Handling, implement packages, developing applets

Exercise - 1 (Basics)

a) Write a JAVA program to display default value of all primitive data type of JAVA

b) Write a java program that display the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminate D and basing on value of D, describe the nature of root.

c) Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a) Write a JAVA program to search for an element in a given list of elements using binary searchmechanism.

b) Write a JAVA program to sort for an element in a given list of elements using bubble sort

c) Write a JAVA program to sort for an element in a given list of elements using merge sort.

d) Write a JAVA program using String Buffer to delete, remove character.

Exercise - 3 (Class, Objects)

a) Write a JAVA program to implement class mechanism. Create a class, methods and invokethem

inside main method.

b) Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a) Write a JAVA program to implement constructor overloading.

b) Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a) Write a JAVA program to implement Single Inheritance

b) Write a JAVA program to implement multi-level Inheritance

c) Write a java program for abstract class to find areas of different shapes

Exercise - 6 (Inheritance - Continued)

a) Write a JAVA program give example for "super" keyword.

b) Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?

Exercise - 7 (Exception)

a) Write a JAVA program that describes exception handling mechanism

b) Write a JAVA program Illustrating Multiple catch clauses

Exercise – 8 (Runtime Polymorphism)

a) Write a JAVA program that implements Run time polymorphism

b) Write a Case study on run time polymorphism, inheritance that implements in above problem

Exercise – 9 (User defined Exception)

a) Write a JAVA program for creation of Illustrating throw

b) Write a JAVA program for creation of Illustrating finally

c) Write a JAVA program for creation of Java Built-in Exceptions

d) d)Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a) Write a JAVA program that creates threads by extending Thread class .First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds ,(Repeat the same by implementing Runnable)

b) Write a program illustrating is A live and join()

c) Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a) Write a JAVA program Producer Consumer Problem

b)Write a case study on thread Synchronization after solving the above producer consumer problem

Exercise – 12 (Packages)

a) Write a JAVA program illustrate class path

b) Write a case study on including in class path in your OS environment of your package.

c) Write a JAVA program that import and use the defined your package in the previous Problem

Exercise - 13 (Applet)

a) Write a JAVA program to paint like paint brush in applet.

b) Write a JAVA program to display analog clock using Applet.

c) Write a JAVA program to create different shapes and fill colors using Applet.

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester II B.sc(IoT) Major (IV Sem)			
Course Code	OPERATING SYSTEMS				
Teaching		L	T	P	C
		---	3	2	4

Course Objectives

1. To understand the services provided by and the design of an operating system.
2. To understand what a process is and how processes are synchronized and scheduled.
3. To understand different approaches to memory management.
4. To understand the structure and commands in unix
5. Students should be able to understand shell programming

Course Outcomes:

COURSE OUTCOM ENO	UPON SUCCESSFUL COMPLETION OF THIS COUSHOULD HAVE THE KNOWLEDGE AND SKILLS
CO1	Analyze the services and functions of operating systems
Co2	Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a givenproblem instance.
Co3	Analyze memory management techniques, concepts ofvirtual memory
Co4	To understand Introduction to Unix:- Architecture of Unix,Features of Unix , Unix Commands
Co5	To understand **Shell programming and** Simple shellprogram examples

UNIT – I

Operating System:

Introduction, Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations. Evolution of Operating Systems ,types of operating system, Simple ,Batch, Multi programmed, time shared, Parallel, Distributed Systems, Real-Time Systems, Operating System services.

UNIT – II

Process and CPU Scheduling:

Process concepts The Process, Process State, Process Control Block, Process communication. Threads. Process Scheduling Scheduling Queues, Schedulers, Context Switch, Pre-emptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms,Process Synchronization, The Critical section Problem, Semaphores, Classic Problems of Synchronization,

UNIT – III

Memory Management and Virtual Memory :

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

UNIT – IV

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

UNIT – V

Shell programming:

Ordinary and environment variables. The profile. Read and read only commands. Command line arguments. exit and exit status of a command. Logical operators for conditional execution. The test command and its shortcut. The if, while, for and case control statements. The set and shift commands and handling positional parameters. The here (<<) document and trap command. Simple shell program examples.

TEXT BOOK:

1. "Operating System Concepts"-Silberschatz, Galvin, Gagne-–eight Edition-John Willey &Sons INC 1,2,3 units
2. Sumitabha Das., Unix Concepts and Applications., 4thEdition., Tata McGraw Hill(4,5) units

REFERENCES BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition,Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press

Student Activity:

1. Load any new operating system into your computer.

2. Partition the memory in your system

3. Create a semaphore for process synchronization.

Recommended Co – Curricular Activities:

Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content andoutside the syllabus content. Shall be individual and challenging)

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

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A) KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
Program & Semester: II B.Sc. AI (III Sem.)
Operating System Model paper
SEMESTER – III

Time: 2 Hours Max **Marks: 50M**

Section -I

Answer any three of the following questions. Must attempt atleast one question from each part. Each question carries 10 Marks.

3 X 10 = 30M

Part – A

1. What are the different types of OS? Explain.
2. What is meant by Real-Time operating system? Its functions and types?
3. Demonstrate Page replacement algorithms?

Part – B

4. What is meant by Real-Time operating system? Its functions and types?
5. What is mean by Architecure of Unix and its commands?
6. Demonstrate Environmental variables?

Section II

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

4 X 5 = 20M

7. Define operating systems and its functions?
8. Explain different types of schedulers?
9. Write about semaphores?
10. Explain Segmentation?
11. Demonstrate Page replacement algorithms?
12. Explain features of UNIX?
13. Explain Logical operators in shell programming?

	Pithapur Rajahs Government College(A) Kakinada	**Program & Semester** I B.Sc. AI(I Sem.)			
Course Code	**TITLE OF THE COURSE** Paper 5: **Operating Systems Lab**				
Teaching	HoursAllocated:30(Theory)	L	T	P	C
Pre-requisites:		3		-	3

Course Objective:

This course enables students to develop OS scheduling logics and also to gain hands-on experience of UNIX OS.

COURSE OUTCOM ENO	UPON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS SHOULD HAVE THE KNOWLEDGE AND SKILLS TO:
CO1	To implement CPU scheduling algorithms in c programminglanguage
CO2	To implement file/directory handling commands in Unix.
CO3	To display list of currently logged users in Unix shell script
CO4	To implement binary search using shell script
CO5	To implement Fibonacci series using shell script

LAB LIST

1. Write the program to implement CPU scheduling algorithm for first come first serve Scheduling
2. Write a program to implement CPU scheduling algorithm for shortest job first scheduling.
3. Write a 'C' program to perform priority scheduling.
4. Write a program to implement CPU scheduling for Round Robin Scheduling.
5. Execute various file/directory handling commands in UNIX.
6. Write a Simple shell script for basic arithmetic and logical calculations.
7. Write a shell script to display list of users currently logged in.
8. Write a shell script to delete all the temporary files.
9. Write a shell script to search an element from an array using binary searching.
10. Write a shell script to determine whether a given number is a prime number or not
11. Write a shell script to print the first *n* Fibonacci numbers.
12. Execute various system administrative commands

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	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester II B.sc Major(IoT) (IV Sem)			
Course Code	COMPUTER ORGANIZATION & ARCHITECTURE				
Teaching		L	T	P	C
		--	3	1	4

Course Objectives:

The course objectives of Computer Organization are to discuss and make student familiar with the

- Principles and the Implementation of Computer Arithmetic
- Operation of CPUs including RTL, ALU, Instruction Cycle and Busses
- FundamentalsofdifferentInstructionSetArchitecturesandtheirrelationshiptothe CPUDesign
- Memory System and I/O Organization
- Principles of Operation of Multiprocessor Systems and Pipelining

Course Outcomes:

By the end of the course, the student will

- Develop a detailed understanding of computer systems
- Cite different number systems, binary addition and subtraction, standard, floating-point,and microoperations
- Develop a detailed understanding of architecture and functionality of central processingunit
- Exemplify in a better way the I/O and memory organization
- Illustrate concepts of parallel processing, pipelining and inter processor communication

UNIT I

Basic Structure of Computers: Basic Organization of Computers, Historical Perspective, Bus Structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating, Point Representation. Other Binary Codes, Error Detection Codes.

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms.

UNIT II

Register Transfer Language and Micro operations: Register Transfer language. Register Transfer Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction Codes, Computer Register, Computer Instructions, Instruction Cycle, Memory – Reference Instructions. Input –Output and Interrupt, Complete Computer Description.

UNIT III

Central Processing Unit: General Register Organization, STACK Organization. Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

Micro programmed Control: Control Memory, Address Sequencing, Micro Program example, Design of Control Unit.

UNIT IV

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer,Modes of

Transfer, Priority Interrupts, Direct Memory Access.

UNIT V

Multi Processors: Introduction, Characteristics of Multiprocessors, Interconnection Structures, Inter Processor Arbitration.

Pipeline: Parallel Processing, Pipelining, Instruction Pipeline, RISC Pipeline, Array Processor.

Text Books:

1) Computer System Architecture, M. Morris Mano, Third Edition, Pearson,2008.
2) Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 5/e, McGrawHill,2002.

Reference Books:

1) Computer Organization and Architecture, William Stallings, 6/e, Pearson,2006.
2) Structured Computer Organization, Andrew S. Tanenbaum, 4/e, Pearson,2005.
3) Fundamentals of Computer Organization and Design, Sivarama P. Dandamudi, Springer,2006.

e-Resources:

1) https://nptel.ac.in/courses/106/105/106105163/

2)http://www.cuc.ucc.ie/CS1101/David%20Tarnoff.pdf

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

MODEL BLUE PRINT FOR MODULE WISE FOR THE YEAR
2024-2025
II B.SC(IoT) 2024-2025 BATCH

COMPUTER ORGANIZATION & ARCHITECTURE
SEMESTER-IV

Time:2.30Hrs **Max Marks:50**

Model Blueprint for the Question paper setter

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

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

2024-2025
II B.SC(IoT) 2024-2025 BATCH

COMPUTER ORGANIZATION AND ARCHITECTURE
SEMESTER-IV
MODEL QUESTION PAPER

Time:2.30Hrs **Max Marks:50**

SECTION-A

Answer any **three** from the following each part atleast **ONE** question answer 3X10=30M

PART-1

1. Discuss the historical perspective of computer organization and its evolution over time.
2. Explain the significance of bus structures in computer architecture and their role in data transfer.
3. Discuss the various micro-operations involved in arithmetic, logic, and shift operations.

PART-II

4. Explain the concept of addressing modes and their role in data transfer and manipulation.
5. Discuss the memory hierarchy and the role of different memory types in computer systems.
6. Explain the concept of parallel processing and its significance in pipeline architecture.

SECTION-B

Answer any **FOUR** Questions from the following 4X5=20M

7. Explain the concept of parallel processing and its significance in pipeline architecture.
8. Define register transfer and give an example.
9. Explain the instruction cycle in computer architecture.
10. What is a stack organization in CPU architecture?
11. Describe a multiplication algorithm used in computer arithmetic.
12. What are the characteristics of auxiliary memory?
13. What is the purpose of inter processor arbitration in multiprocessor systems?

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A),KAKINADA

2024-2025
II B.SC(IoT) 2024-2025 BATCH
SEMESTER III

COMPUTER ORGANIZATION & ARCHITECTURE LAB

Course Objectives:

Upon completion of the Course, the students will be able to:

- Know the characteristics of various components.
- Understand the utilization of components

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand working of logic families and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Solve elementary problems by assembly language programming
- Implement assembly language program for given task for 8086 microprocessors.

List of Experiments:

1. Realization of Boolean Expressions using Gates
2. Design and realization logic gates using universal gates
3. Design a JK Flip-Flop, Edge triggered J-K NAND Flip Flop and show its functionality Handle race condition and clock gating in your circuit.
4. Design a 4 – bit Adder / Subtractor
5. Combinational logic circuits: Implementation of Boolean functions using logic gates
6. Arithmetic operations using logic gates; Implementation of Multiplexers, Demultiplexers, Encoders, Decoders; Implementation of Boolean functions using Multiplexers/Decoders
7. Study of sequential logic circuits: Implementation of flip flops, Verify the excitation tables of various FLIP-FLOPS.
8. Design and realization a Synchronous and Asynchronous counter using flip-flops
9. Design and realization of an 8-bit parallel load and serial out shift register using flipflops
10. Implementation of counters, Design and realization a Synchronous and Asynchronous counter using flip-flops
11. Design and realization of 4x1 mux, 8x1mux using 2x1 mux

Write assembly language programs in 8086 for the following: (MASAM can also beused)

1. To add two 8 bit number (A+B=RESULT with a carry and without a carry).
2. To subtract one 8 bit number from another (A-B=RESULT with a borrow andwithout a borrow).
3. To find out AND, OR, NOT, XOR, NAND, NOR, XNOR of two 8 bit number.
4. To find out addition of two 16 bit numbers.
5. To find out subtraction of two 16 bit numbers.
6. To evaluate the expression a = b + c –d * e

   Considering 8-bit, 16 bit and 32-bit binary numbers as b, c, d, e.

   Take the input in consecutive memory locations and results also Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
7. To take N numbers as input. Perform the following operations on them.

a. Arrange in ascending and descending order.
b. Find max and minimum
c. Find average

   Considering 8-bit, 16-bit binary numbers and 2-digit, 4 digit and 8-digit BCD numbers.Display the results by using "int xx" of 8086. Validate program for the boundary conditions.

8. To implement the above operations as procedures and call from the main procedure.
9. To find the factorial of a given number as a Procedure and call from the main program which display the result.

Note: Experiments can be done using Logic board, EasyCPU, RTSlim, Little Man Computer (LMC), Assemblers for 8085 programming, 8086 based trainer kits, MIPS simulator PCSpim, Xilinx schematic editor and simulation tools or any other choice

SEMESTER – V

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 6A: Machine Learning for Internet of Things				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic Electronics	3	1	-	3

Course Objectives:

The main objective of this course is to introduce the students to the basics of Machine LearningConcepts applicable with Internet of Things.

- To learn and understand the basics of Machine Learning and IoT
- To get acquainted with machine learning for IOT Data Analysis.
- To learn and understand Machine learning and deep learning methods for IoT applications.
- To design IoT applications using ML , DL methods
- To understand the Internet of Things and its benefits for society

Course Outcomes:

Students after successful completion of the course will be able to -	
CO1	Identify and understand the machine learning elements and techniques
CO2	Implement data preprocessing methods for IoT using python
CO3	Compare Machine Learning and Deep Learning
CO4	Identify and understand Machine Learning accelerators for IoT Devices
CO5	Design & implement deep learning model for sensor data
CO6	Compare advanced machine learning techniques

Syllabus:

Unit I **10 Hours**

Overview of Machine Learning: Introduction to Machine Learning: Introduction to ML, Introduction to Statistical Learning Methods, Classic and adaptive machines, Machine-Learning Problem, Machine-Learning Techniques and Paradigms, Machine Intelligence, Elements of Machine Learning, Introduction to Advanced ML - Deep Learning, Reinforcement Learning.

Unit II **10 Hours**

Predictive Analysis for IoT: IOT Data Pre-processing: Data Preparation for Predictive Maintenance Modeling, Cleaning and Standardizing IoT Data, Applying Advanced Data Exploration Techniques Feature Engineering: Exploring Feature Engineering, Applying Feature Selection Techniques, Feature set selection using ML, Machine learning for Internet of Things data analysis

Unit III **10 Hours**

Machine learning (ML) methods for IoT Applications: Decision Trees (DTs), Support Vector Machines (SVMs), Bayesian theorem-based algorithms, kNearest neighbour (KNN), Random forest (RF), Association Rule (AR) algorithms, Ensemble learning (EL), k-Means clustering, Principal component analysis (PCA)

Unit IV **10 Hours**

Deep learning (DL) methods for IoT Applications: Convolutional neural networks (CNNs), Recurrent neural networks (RNNs), Deep autoencoders (AEs), Restricted Boltzmann machines (RBMs), Deep belief networks (DBNs), Generative adversarial networks (GANs), Ensemble of DL networks (EDLNs)

Unit V **10 Hours**

Machine Learning Accelerators for IoT Devices: Compact fast Machine Learning Accelerators for IOT devices: Edge Computing on IOT Devices, IOT Based Smart Buildings, Distributed Machine Learning

Deep Learning for IOT: Deep Learning Models For Sensor Data, Embedded Deep Learning, Real Time IOT Imaging with Deep Neural Network.

Applications of ML and IOT : Case Studies: IOT for Agriculture, Remote Patient Monitoring, Smart City, Smart Transportation, IOT Security using ML

Text Books:

1. Ethem ALPAYDIN, "Introduction to Machine Learning" ,The MIT Press, October 2004, ISBN0-262-01211-1
2. Hantao Huang, Hao Yu, "Compact and Fast Machine Learning Accelerator for IoT Devices,"Edition: 1st ed. Publisher: Springer Singapore Year: 2019ISBN: 978-981-13-3323- 1

Reference Books:

1. Trevor Hastie Robert Tibshirani Jerome Friedman, "The Elements of Statistical Learning: DataMining, Inference, and Prediction", Second Edition, Springer Series in Statistics, Feb 2009
2. Tom M. Mitchell , " Machine Learning", McGraw-Hill Science/Engineering/Math; (March 1,1997)ISBN: 0070428077
3. Neeraj Kumar, Aaisha Makkar, " MACHINE LEARNING IN COGNITIVE IOT", https://www.routledge.com/Machine-Learning-in-Cognitive-IoT/KumarMakkar/p/book/9780367359164 ISBN 9780367359164 Published June 1, 2020 byCRC Press
4. Puneet Mathur, " IoT Machine Learning Applications in Telecom, Energy, and Agriculture,With Raspberry Pi and Arduino Using Python", ISBN 978-1-4842-5549-0
5. Nicolas Modrzyk, " Real-Time IoT Imaging with Deep Neural Networks - Using Java on the Raspberry Pi 4" , Apress Publication , Year: 2020, ISBN: 9781484257210, 978148425722

Web Links:

6. Predictive Analytics for IOT, by Microsoft on edx Link:

   https://www.edx.org/course/predictive-analytics-for-iotsolutions?source=aw&awc=6798_1594277292_cca42f86ac9afe29904595a53aad9e1c
7. INTERNET of Things and Machine Learning Training Link:

   https://shop.boltiot.com/products/internet-of-things-and-machine-learning-training
8. https://www.tutorialspoint.com/machine_learning/index.htm
9. https://ocw.mit.edu/courses/6-036-introduction-to-machine-learning-fall-2020/
10. https://www.edx.org/course/machine-learningCo-Curricular Activities

a) **Mandatory:** *(Training of students by teacher in field related skills: (lab: 10 + field: 05) :*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours on Collecting various weather related data using sensors to develop a Campus weather report prediction model by applying various machine learningalgorithms.
2. **For Student**: Students shall (individually) study various weather sensors and actuators and IoT prototype boards to develop a solution for the campus weather forecasting and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages.
3. Max marks for Fieldwork/Project work//Projectwork Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations, findings andacknowledgements*.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Develop a solution for the case study identified.
2. Training of students by related industrial experts.
3. Assignments
4. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
5. Presentation by students on best machine learning model for various scenarios

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
CO1													
CO2													
CO3													
CO4													
CO5													

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-1	2	1	25
UNIT-2	1	2	20
UNIT-3	1	2	20
UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE (AUTONOMOUS), KAKINADA
(Accredited by NAAC "A" Grade)

II B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023)

PAPER- IOT 117- 6A: Machine Learning for Internet of Things
SEMESTER – V

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

SECTION – I

Answer any three of the following questions. Must attempt atleast one question from each part . Each question carries 10 Marks. (3x10=30M)

Part-A

1. ESSAY FROM MODULE 1
2. ESSAY FROM MODULE 1
3. ESSAY FROM MODULE 2

Part-B

4. ESSAY FROM MODULE 3
5. ESSAY FROM MODULE 4
6. ESSAY FROM MODULE 5

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. SHORT FROM MODULE 1
8. SHORT FROM MODULE 2
9. SHORT FROM MODULE 2
10. SHORT FROM MODULE 3
11. SHORT FROM MODULE 3
12. SHORT FROM MODULE 4
13. SHORT FROM MODULE 5

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (VSem)			
Course Code	**TITLE OF THE COURSE** 6A: Machine Learning lab				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	Python	0	0	3	2

Objectives:

On successful completion of this practical course, student shall be able to:

1. Understand the implementation procedures for the machine learning algorithms
2. Design Python programs for various Learning algorithms.
3. Apply appropriate data sets to the Machine Learning algorithms
4. Identify and apply Machine Learning algorithms with IoT to solve real world problems

List of Experiments

1. **Programming for IOT : R- programming, Python Libraries, Azure Cloud platform Examining Machine Learning for IoT**

   Develop an Application on Arduino/Raspberry-Pi to capture the values of temperature sensor after every 15 sec of time interval, store these values in .csv format and predict the temperature at particular time t using linear regression analysis.
   Hint: Create the dataset of at least 20-25 instances, use any data analysis tool (WEKA/R)

2. **Getting Started with Azure Machine Learning**

   Deploy your first Azure/Think Speak IoT Edge module to a virtual Linux orWindows device
   Experiments:

   a. Deploy your first IoT Edge module to a Linux device
   b. Deploy your first IoT Edge module to a Windows device
   c. Things Speak for IoT
   d. Collect the sensor data on private cloud using Things Speak

3. **Exploring Code-First Machine Learning with Python**

   a. Download the Dataset of your choice
   b. Divide the dataset into Training data and Testing data.
   c. Perform the classification of the instances using any machine learning algorithmlike KNN Algorithm, Naïve Bayes, Decision Tree or any.
   d. Evaluate the machine learning model by considering the parameter (TPR, TNR,FPR, FNR, accuracy, precision, recall, error rate etc.)

References

1. https://www.kaggle.com/datasets
2. https://archive.ics.uci.edu/ml/datasets.php

Virtual LabLinks:

1. https://ocw.cs.pub.ro/courses/iot/labs

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)
Course Code	**TITLE OF THE COURSE**	
	7A: COMPUTER VISION	

Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Images, Image representations	3	1	-	3

Course Objectives:

1. To introduce students the fundamentals of image formation;
2. To introduce students the major ideas, methods, and techniques of computer vision and patternrecognition;
3. To develop an appreciation for various issues in the design of computer vision and objectrecognition systems; and
4. To provide the student with programming experience from implementing computer vision andobject recognition applications

Course Outcomes:

Students after successful completion of the course will be able to:	
CO1	To implement fundamental image processing techniques required for computer vision
CO2	Understand Image formation process
CO3	To perform various analysis on image to extract features form Images
CO4	To develop applications using computer vision techniques

Syllabus:

Unit-1: (10 hours)

Introduction to Computer Vision Image Processing, Computer Vision and Computer Graphics, Computer Vision Applications: Document Image Analysis, Biometrics, Object Recognition, Tracking, Medical Image Analysis, Content-Based Image Retrieval, Video Data Processing, Multimedia, Virtual Reality and Augmented Reality

Unit-2: (10 hours)

Image Representation And Analysis Image representation, Image processing techniques like color and geometric transforms, Edge-detection Techniques, Filtering, Mathematical operations on image and its applications like convolution, filtering

Unit-3: (10 hours)

Motion Estimation Introduction to motion, Regularization theory, Optical computation, StereoVision, Motion estimation, Structure from motion and models

Unit-4: (10 hours)

Object Recognition Hough transforms and other simple object recognition methods, Shape correspondence and shape matching, Principal component analysis, Shape priors for recognition**Unit-5:** (10 hours)

Applications Photo album, Face detection, Face recognition, Eigen faces, Active appearance and 3D shape models of faces Application: Surveillance, foreground background separation, particle filters, Chamfer matching, tracking, and occlusion, combining views from multiple cameras, human gait analysis Application: **Invehicle vision system**: locating roadway, road markings, identifying road signs, locating pedestrians

References

1. Computer Vision - A modern approach, by D. Forsyth and J. Ponce, Prentice Hall Robot Vision,by B. K. P. Horn, McGraw-Hill.
2. Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher: PrenticeHall.
3. R. C. Gonzalez, R. E. Woods. Digital Image Processing. Addison Wesley Longman, Inc., 1992.
4. D. H. Ballard, C. M. Brown. Computer Vision. Prentice-Hall, Englewood Cliffs, 1982.
5. Richard Szeliski, Computer Vision: Algorithms and Applications (CVAA). Springer, 2010 6.Image Processing, Analysis, and Machine Vision. Sonka, Hlavac, and Boyle. Thomson.
6. E. R. Davies, Computer & Machine Vision, Fourth Edition, Academic Press, 2012
7. Simon J. D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge UniversityPress, 2012
8. Mark Nixon and Alberto S. Aquado, Feature Extraction & Image Processing for ComputerVision, Third Edition, Academic Press, 2012.
9. Web resources:
    a. https://opencv.org/opencv-free-course/
    b. https://www.kaggle.com/learn/computer-vision
10. Other web sources suggested by the teacher concerned and the college librarianincluding reading material

II. Co-Curricular Activities:

a) **Mandatory:** *(Training of students by teacher in field related skills: (lab: 10 + field: 05) :*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours on demonstrating various Computer Vision Applications for Internet of things to develop a case study for implementing a solution for a real world problem with IOT Computer Vision etc.
2. **For Student**: Students shall (individually) search for possible areas of application of computer vision to develop solution using IoT and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages. Example: Choosing an area such as Traffic prediction and alert system with OpenCV and Raspberry Pi.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page,details of place or websites visited, structure of thewebsite and acknowledgements*.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Arrange expert lectures by IT experts working professionally in the area of Computervision and other related areas of IoT
2. Assignments (in writing or implementing contents related to syllabus or outside thesyllabus.Shall be individual and challenging)

3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).

4. Preparation by students on best websites.
5. Arrange a webpage development competition among small groups of students.

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
CO1													
CO2													
CO3													
CO4													
CO5													

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-1	**2**	**1**	**25**
UNIT-2	**1**	**2**	**20**
UNIT-3	**1**	**2**	**20**
UNIT-4	**1**	**1**	**15**
UNIT-5	**1**	**1**	**15**
Total No. of questions	**6**	**7**	
Total Marks Including choice			**95**

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE (AUTONOMOUS), KAKINADA
(Accredited by NAAC "A" Grade)

III B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023) PAPER- 7A:
COMPUTER VISION

SEMESTER – V

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

SECTION – I

Answer any three of the following questions. Must attempt atleast one question from each part . Each question carries 10 Marks. (3x10=30M)

Part-A

1. ESSAY FFROM MODULE 1
2. ESSAY FROM MODULE 1
3. ESSAY FROM MODULE 2

Part-B

4. ESSAY FROM MODULE 3
5. ESSAY FROM MODULE 4
6. ESSAY FROM MODULE 5

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. SHORT FROM MODULE 1
8. SHORT FROM MODULE 2
9. SHORT FROM MODULE 2
10. SHORT FROM MODULE 3
11. SHORT FROM MODULE 3
12. SHORT FROM MODULE 4
13. SHORT FROM MODULE 5

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 7A: COMPUTER VISION				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	Image representation	0	0	3	2

Objectives:

On successful completion of this practical course, student shall be able to:

1. Implement fundamental image processing techniques with OpenCV
2. Perform various analysis on image to extract features form Images with OpenCV
3. Develop image recognition system for IOT

List of Experiments

1. Import libraries
2. Rgb image and resizing
3. Grayscale image
4. Image denoising, Image thresholding, Image gradients
5. Edge detection fourier transform on image
6. Line transform
7. Corner detection
8. Morphological transformation of image, Geometric transformation of image
9. Contours
10. Image pyramids
11. Colorspace conversion and object tracking
12. Interactive foreground extraction 13. Image segmentation, Image inpainting 14. Template matching
15. Face and eye detection

Virtual LabLinks:

1. https://ocw.cs.pub.ro/courses/iot/labs/01

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	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 6B: Java Programming for Internet of Things				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Java programming	3	1	-	3

Course Objectives:

1. Programming for IoT is usually a polyglot (multiple languages) effort since the Internet-of-Things.
2. (IoT) is a system of inter-related computing devices that are provided with unique identifiersand the ability to transfer data over a network.
3. The choice of programming-language depends on the capability and purpose of the device.
4. IoT encompasses a variety of devices including edge devices, gateways, and cloud servers.

Course Outcomes:

Students after successful completion of the course will be able to:	
CO1	Understand the basic concepts of Java Programming
CO2	Apply the programming knowledge to some of the biggest trending applications today
CO3	Understand how to program Java to interact with operating systems, networking, and mobile Applications
CO4	Develop trending tech applications in the area of IoT (Internet of Things)
CO5	Find out firsthand how Java can be used for connected home devices, healthcare, the cloud, and all the hottest tech applications

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT-I **(10 HOURS)**

Introduction to Java : What Is Java, Versions of Java, Java Architecture, Editions of Java, The Java Spring Framework, Advantages and Disadvantages of Java, Java Certification, Downloading and Installing Java, Java IDEs, Java Hello

World Program, Java Online Compilers, Java Online Code

Converters

Basic Java Programming: Introduction, Variables, Constants, Comments, Naming Conventions, The String and StringBuffer Types, The VAR Variable Type, Operators, Reserved Words, Input and Output, Loops and Selections

UNIT-II **(10 HOURS)**

Arrays, Matrices, and ArrayLists: Reading and Writing Files, Methods, Object-Oriented Programming, Classes and Objects, Instantiation, Encapsulation, Inheritance, Overriding and Overloading, Polymorphism, Object Accessibility, Anonymous Inner Classes, Multithreading,

The Life Cycle of a Thread, Thread Priorities, Thread Scheduling, Thread Synchronization, Date, Time, Timer, and Sleep Methods, Executing System Commands, Packages and Programming on a Large Scale, Deploying Java Applications: Using a Windows Batch File, Using an Executable JAR File, Using Microsoft Visual Studio, Java Application Installations

UNIT-III **(10 HOURS)**

Java Programming for Windows Applications: Introduction, Java Swing Application, JavaFX Applications, JavaFX Window, Creating a Label and Button in JavaFX, JavaFX Charts, Handling Logins in JavaFX, Creating an Image Viewer in JavaFX, Creating a JavaFX Web Viewer, Creating a Menu in JavaFX, Creating a JavaFX File Chooser, JavaFX Tutorials, Deploying JavaFX Applications

UNIT-IV **(10 HOURS)**

Java Programming for Mobile Applications: Introduction, Android Studio, The Hello WorldApp, The Button and TextView Apps, The Sensor App, Deploying Android Apps, The Activity Life Cycle of an Android App

MIT App Inventor: Speech Recognition App, Translation App, Millimeter Waves, Small Cells, Massive MIMO, Beamforming, Full Duplex, Future 6G and 7G

UNIT-V **(10 HOURS)**

Java Programming for IoT Applications: IoT Communication Protocols-MQTT, CoAP, XMPP, SOAP, REST, Java IoT with Raspberry Pi: Java GPIO Examples, Running Python Programs from Java, Java PWM Example, Java PIR and LED Example, Java I2C Example, Java ADC Examples, Java Digital Sensor Examples, Java MQTT Example, Java REST Example

Other Java IoT Uses: Eclipse Open IoT Stack for Java, IBM Watson IoT for Java, Amazon IoT for Java, Microsoft Azure IoT for Java

References

1. Xiao, Perry. “Practical Java Programming for IoT, AI, and Blockchain” 2019.
2. Stephen Chin, James L Weaver, “Raspberry Pi with Java: Programming the Internet ofThings (IoT)”, McGraw-Hill, ISBN: 9780071842020
3. J. F. DiMarzio, “JavaFX A Beginners Guide”, Oracle Press, ISBN: 9780071742405
4. Joshua Bloch, “Effective Java”, Second Edition, 2016, ISBN: 9789332576537
5. Joshua Marinacci , “Building Mobile Applications with Java” 2012, O'Reilly Media, Inc.ISBN: 9781449308230
6. Web Links:
   a. https://www.classcentral.com/course/independent-develop-java-embedded-applications-using-a-raspberry-pi-2051
   b. https://www.udemy.com/course/iot-turn-a-light-on-with-java-raspberry-pi-and-apis/
7. Other web sources suggested by the teacher concerned and the college librarian includingreading material.

I. Co-Curricular Activities

a) **Mandatory:** *(Training of students by teacher in field related skills: (lab: 10 + field: 05) :*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours to develop an Android App/Web App to Visualize the Temperature, Humidityvalues read by the sensors and to control the Air Conditioners from the APP.
2. **For Student**: Students shall (individually) study various sensors and actuators and IoT prototype boards to develop an APP to read and visualize the data read by the sensors and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages.
3. Max marks for Fieldwork/Project work//Projectwork Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations, findings andacknowledgements*.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Arrange expert lectures by IT experts working professionally in the area of App developmentfor IoT
2. Assignments (in writing or implementing contents related to syllabus or outside the syllabus.Shall be individual and challenging)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation by students on best App designs.

Arrange a IoT App development competition among small groups of students

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
CO1													
CO2													
CO3													
CO4													
CO5													

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-1	2	1	25
UNIT-2	1	2	20
UNIT-3	1	2	20
UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE (AUTONOMOUS), KAKINADA
(Accredited by NAAC "A" Grade)

III B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023)

PAPER- 6B: Java Programming for Internet of ThingsSEMESTER – V

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

SECTION – I

Answer any three of the following questions. Must attempt atleast one question from each part . Each question carries 10 Marks. (3x10=30M)

Part-A

1. List and explain Looping statements in Java?
2. Explain the features of Java?
3. Discuss the basic concepts of OOP

Part-B

4. Explain how to create label and button in JavaFx
5. Explain about IOT communication protocols
6. write about Amazon IoT for java.

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. . Explain structure of a java program
8. Mention advantages and disadvantages of java
9. What is encapsulation? Illustrate with an example.
10. Explain the life cycle of a thread
11. Explain about JavaFx
12. Explain about Android studio
13. What is Raspberry Pi? Explain.

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 6B: Java Programming for Internet of Things LAB				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	DBMS and Java	0	0	3	2

Objectives

1. (IoT) is a system of inter-related computing devices that are provided with unique identifiersand the ability to transfer data over a network.
2. The choice of programming-language depends on the capability and purpose of the device.
3. IoT encompasses a variety of devices including edge devices, gateways, and cloud servers

List of Experiments

1. Write a Java Program to demonstrate String and StringBuffer types
2. Write a Java Program to perform various operations on Two dimensional Arrays
3. Write a Java Program to read and display the contents of a File
4. Write a Java Program to demonstrate Encapsulation
5. Write a Java Program to demonstrate Multiple Inheritance
6. Write a Java Program to demonstrate the Life cycle of a Thread
7. Write a Java Program to handle Logins using JavaFX
8. Write a Java Program to create Menus using JavaFX
9. Demonstrate the Installation of Android Studio
10. Write a Java Program to create a simple App in Andriod Studio
11. Create an App using MIT App inventor
12. Write a Java Program to read the data from various sensors in RPi
13. Write a Java Program to connect to Amazon Cloud.

Virtual LabLinks:

1. https://www.iiitmk.ac.in/DAVirtalLab/

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 7B: Big Data and Analytics				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	DBMS	3	1	-	3

Course Objectives:

1. Big data analytics helps organizations harness their data and use it to identify new opportunities.
2. That, in turn, leads to smarter business moves, more efficient operations, higher profits andhappier customers.
3. Businesses that use big data with advanced analytics gain value in many ways, such as:Reducing cost.

Course Outcomes:

Students after successful completion of the course will be able to:	
CO1	Learn tips and tricks for Big Data use cases and solutions.
CO2	Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
CO3	Apply Hadoop ecosystem components.
CO4	Apply Big Data in IoT
CO5	Analyze the huge volume of data collected from IoT devices

Course with focus on employability / entrepreneurship / Skill Development modules

Syllabus:

UNIT-I **(10 HOURS)**

Introduction to big data: Classification of Digital Data-Structured, Semi-Structured Data, Un- structured, Characteristics of data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data-Volume, Velocity, Variety, Why Big Data, Business Intelligence verses Big Data.

UNIT-II **(10 HOURS)**

Big data analytics: What is Big Data Analytics, Classification of big data analytics, Data science, Data Scientist, **Terminology Used in Big Data Environment**-InMemory Analytics, In-Database Processing,

Symmetric Multiprocessor System, Massively Parallel Processing, Distributed Systems, Cap theorem, Introduction to Open-Source analytical tools.

UNIT-III **(10 HOURS)**

Big Data Technology: NoSQL Database-Definition,Types of NoSQL Database,Why NoSQL?Advantages of NoSQL, NewSQL, comparision of SQL, NoSQL, NewSQL.

Introduction to MongoDB-Definition, Using Java Script Object Notation(JSON),Creating Unique Key, Support for dynamic Queries, Storing Binary Data, Replication, Sharding, Terms used in RDBMS and MonogoDB- Create Database,Drop Database,Datatypes in Monogodb, MonogoDB Query Language (Create,Read,Update,and Delete).

UNIT-IV **(10 HOURS)**

Introduction to Hadoop :Introducing Hadoop, need of Hadoop, RDBMS versus Hadoop. Hadoop Overview-Key Aspects of Hadoop, Hadoop Components,High level Architecture of Hadoop, Use Case of Hadoop, **HDFS** (Hadoop Distributed FileSystem),Processing Data with Hadoop.

Introduction to MAPREDUCE Programming: Introduction , Mapper, Reducer, Combiner, Partitioner , Searching, Sorting , Compression, Real time applications using MapReduce.

UNIT-V **(10 HOURS)**

Case studies: Applications of Big Data using Hive Architecture, Hive Data types, Hive QueryLanguage(HQL), Pig on Hadoop.

Machine Learning Algorithms-Implementation of Regression, Implementation of k- Means.

References

1. Chris Eaton, Dirk deroos et al. "Understanding Big data ", McGraw Hill, 2012.
2. SeemaAcharya, SubhashiniChellappan, Big Data Analytics, Wiley,2019
3. Runkler, Thomas. A, Data Analytics: Models and Algorithms for Intelligent Data Analysis,Springer, 2012.
4. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
5. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, "Big Data ,Big Analytics: Emerging Business Intelligence and Analytics Trends for Todays Businesses", Wiley
6. Web Links:
   a. https://www.mygreatlearning.com/academy/learn-for-free/courses/ai-and-big-data-in-iot
   b. https://www.tutorialspoint.com/hadoop/hadoop_big_data_overview.htm
   c. https://www.w3schools.in/hadoop/tutorials/
   d. https://www.simplilearn.com/tutorials/big-data-tutorial/big-data-applications
7. Other web sources suggested by the teacher concerned and the college librarian includingreading material.

I. Co-Curricular Activities

c) **Mandatory:** *(Training of students by teacher in field related skills: (lab: 10 + field: 05) :*

6. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours to connect and store the IoT device data in MongoDB and apply various commands to retrieve/manipulate and analyze the data for identifying the patterns.
7. **For Student**: Students shall (individually) study various Analytics performed on Data and AWS IOT web services to store huge volume of data generated by sensor networks and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages.
8. Max marks for Fieldwork/Project work//Projectwork Report: 05.
9. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations, findings andacknowledgements*.
10. Unit tests (IE).

d) Suggested Co-Curricular Activities

1. Arrange expert lectures by IT experts working professionally in the area of Microsoft Azure/Amazon AWS IoT Services
2. Assignments (in writing or implementing contents related to syllabus or outside the syllabus.Shall be individual and challenging)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Presentation by Students on various proprietary/open source Cloud technologies for IoT.

CO-PO Mapping:

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

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-1	2	1	25
UNIT-2	1	2	20
UNIT-3	1	2	20
UNIT-4	1	1	15
UNIT-5	1	1	15

Total No. of questions	**6**	**7**		
Total Marks Including choice			**95**	

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

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE (AUTONOMOUS), KAKINADA
(Accredited by NAAC "A" Grade)

III B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023)

PAPER-7B: Big Data and Analytics
SEMESTER – V

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

SECTION – I

Answer any three of the following questions. Must attempt atleast one question from each part . Each question carries 10 Marks. (3x10=30M)

Part-A

1. Describe the challenges with Big data?
2. Describe massive parallel processing and distributed system
3. Explain Classification of Big data Analytics

Part-B

4. Briefly explain about JSON?
5. the classification of NO SQL Database and explain about colums based database
6. Explain Applications of Big Data using Hive Architecture

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. Explain classification of Big Data?
8. Why Big Data is Important?
9. Write Cap Theoem .
10. Describe about Open Source Analytical Tools.?
11. Define Datatypes in MongoDB
12. Explain High Level Architecture of Hadoop?
13. Explain Hive Query Language(HQL)?

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code IoT120P	**TITLE OF THE COURSE** 7B: Big Data and Analytics LAB				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	DBMS Lab	0	0	3	2

Objectives

1. That, in turn, leads to smarter business moves, more efficient operations, higher profits andhappier customers.
2. Businesses that use big data with advanced analytics gain value in many ways, such as:Reducing cost.

List of Experiments

1. Installation of Hadoop
    a. Ubuntu Operating System in stand-alone mode
    b. Psuedo Distributed Mode(Locally)
    c. Psuedo Distributed Mode(YARN)
2. File Management tasks in Hadoop
    a. Create a directory in HDFS at given path(s).
    b. List the contents of a directory.
    c. Upload and download a file in HDFS.
    d. See contents of a file
    e. Copy a file from source to destination
    f. Copy a file from/To Local file system to HDFS
    g. Move file from source to destination.
    h. Remove a file or directory in HDFS.
    i. Display last few lines of a file.
    j. Display the aggregate length of a file.
3. Word Count Map Reduce program to understand Map Reduce Paradigm
4. Weather Report POC-Map Reduce Program to analyse time-temperature statistics andgenerate report with max/min temperature.
5. Implementing Matrix Multiplication with Hadoop Map Reduce

6. Pig Latin scripts to sort, group, join, project, and filter your data.
7. Hive Databases, Tables, Views, Functions and Indexes

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 6C: Web of Things				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Basic computer programming	3	1	-	3

Course Objectives:

1. The W3C Web of Things (WoT) is intended to **enable interoperability across IoTplatforms and application domains**.
2. Overall, the goal of the WoT is to preserve and complement existing IoT standards andsolutions.

Course Outcomes:

Students after successful completion of the course will be able to:	
CO1	Connect electronic actuators and sensors (GPIO) to a Raspberry Pi Implement standard REST and Pub/Sub APIs with Node.js on embedded systems.
CO2	Learn about IoT protocols like MQTT and CoAP and integrate them to the Web of Things Use the Semantic Web (JSON-LD, RDFa, etc.) to discover and find Web Things.
CO3	Share Things via Social Networks to create the Social Web of Things
CO4	Build a web-based smart home with HTTP and WebSocket
CO5	Compose physical mashups with EVRYTHNG, Node-RED, and IFTTT

Syllabus:

Unit - I **(10 hours)**

BASICS OF THE IOT AND THE WOT - From the Internet of Things to the Web of Things : Defining the Internet of Things , Enter the Web of Things, Web of Things scenario, Comparing IoT and WoT , The Internet of Things - a brief history and Use cases, The Web of Things - a supercharged Internet of Things

Hello, World Wide Web of Things , Meet a Web of Things device ,Browse a device on the Web of Things , The web as user interface, The web as an API, Polling data from a WoT sensor, Polling the current sensor value, Polling and graphing sensor values, Real-time data updates, Act on the real

world, Use a form to update text to display, Create your own form to control devices, Tell the world about your device, Create your first physical mashup

Unit – II **(10 hours)**

Node.js for the Web of Things: The rise of JavaScript: from clients to servers to things, Pushing JavaScript to things, Introduction to Node.js, Installing Node.js on your machine, your first web server in Node.js, Returning sensor data as JSON, Modularity in Node.js, npm the Node package manager, clean dependencies with package. Json and npm, Your first Node module, Understanding the Node.js event loop, Multithreaded web servers, Single-threaded, non-blocking web servers, Getting started with asynchronous programming, Anonymous callbacks, Named callbacks, Control flow libraries Getting started with embedded systems, The world of embedded devices, Devices for hobbyists vs. industrial devices, Real-time operating systems vs. Linux , Set up your first WoT device, Setting up your Raspberry Pi, Connecting to your device, Installing Node.js on the Raspberry Pi , Using Git and GitHub on the Pi , Connecting sensors and actuators to your Pi, Understanding GPIO ports , Accessing GPIOs from Node.js

Unit – III **(10 hours)**

Building networks of Things: Connecting Things, Network topologies, Network classification models, Networking protocols for Things, Spatial considerations, Internet protocols and the IoT, IoT personal area networks, IoT wide area networks, Application protocols for Things- ZigBee and Bluetooth application stacks, Apple HomeKit and Google Weave, Message Queuing Telemetry Transport, Constrained Application Protocol, The Web of Things architecture: Access, Find, Share, Compose

Access: Web APIs for Things: Devices, resources, and web Things, Representational State Transfer, why do we need a uniform interface? Four Principles, **Beyond REST:** the real-time Web of Things , The WoT needs events- Publish/subscribe, Webhooks - HTTP callbacks, WebSocket, The future: from HTTP/1.1 to HTTP/2

Unit – IV **(10 hours)**

Implementing web Things, Connecting devices to the web, Direct integration pattern- REST on devices , Creating a WoT server, Resource design, Representation design, Interface design, Pub/sub interface via WebSocket

Gateway integration pattern- CoAP example, running a CoAP server, Proxying CoAP via a gateway

Cloud integration pattern-MQTT over EVRYTHNG - Set up your EVRYTHNG account, create your MQTT client application, use actions to control the power, Create a simple web control application

Find: Describe and discover web Things- The findability problem, Discovering Things- Network discovery- Resource discovery on the web , Describing web Things- Introducing the Web Thing Model-Metadata, Properties-Actions - Things -Implementing the Web Thing Model on the Pi, The Semantic Web of Things - Linked data and RDFa , Agreed-upon semantics: Schema.org , JSON-LD

Unit – V **(10 hours)**

Share: Securing and sharing web Things-Securing Things-Encryption, Web security with TLS: the S of HTTPS, Enabling HTTPS and WSS with TLS on your Pi , Authentication and access control-Access control with REST and API tokens, OAuth: a web authorization framework , The Social Web of Things - Social Web of Things authentication proxy- Implementing a Social WoT authentication proxy

Compose: Physical mashups - Building a simple app—automated UI generation -universal user interface for web Things , Physical mashups -Boxes and wires mashups for the Physical Web: Node-RED , Using wizards for physical mashups: IFTTT -Pushing intruder alert tweets to a Google spreadsheet , Sending requests to a Thing with the Maker Channel , Pushing intruder alert tweets to a Google spreadsheet From simple mashups to big data mashups

References

1. Building the Web of Things With examples in Node.js and Raspberry Pi,Dominique D.Guinard and Vlad M. Trifa, June 2016 , Manning, ISBN 9781617292682
2. Using the Web to Build the IoT, Dominique Guinard and Vlad Trifa in collaboration withManning.
3. Samuel Greengard "The Internet of Things" MIT Press Essential Knowledge Series,2015, ASIN: B00VB719VS
4. Jain, Aarti, Rubén González Crespo, and Manju Khari. 2020. Smart innovation of web ofthings. https://www.taylorfrancis.com/books/978042929846
5. Web resources:
    a. http://book .webofthings.io
    b. https://webofthings.org/
6. Other web sources suggested by the teacher concerned and the college librarianincluding reading material.

II. Co-Curricular Activities

a) **Mandatory:** *(Training of students by teacher in field related skills: (lab: 10 + field: 05) :*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for not less than 15 hours to integrate a Raspberry Pi/Arduino to Web of Things to erect

smart home with various sensors.

2. **For Student**: Students shall (individually) search online and identify any one case study for WoT such as Smart Agriculture, Smart retails etc., and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages.
3. Max marks for Fieldwork/Project work/Project work/Project work/Project work/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, details of place visited, observations, findings and acknowledgements*.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Develop a WoT with 10 pages for the case study identified.
2. Training of students by related industrial experts.
3. Assignments
4. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
5. Presentation by students on different tools for WoT.

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
CO1													
CO2													
CO3													
CO4													
CO5													

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
UNIT-1	**2**	**1**	**25**
UNIT-2	**1**	**2**	**20**
UNIT-3	**1**	**2**	**20**
UNIT-4	**1**	**1**	**15**
UNIT-5	**1**	**1**	**15**

Total No. of questions	**6**	**7**	
Total Marks Including choice			**95**

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE (AUTONOMOUS), KAKINADA
(Accredited by NAAC "A" Grade)

III B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023) PAPER-6C:
Web of Things

SEMESTER – V

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

SECTION – I

Answer any three of the following questions. Must attempt atleast one question from each part . Each question carries 10 Marks. **(3x10=30M)**

Part-A

1. ESSAY FFROM MODULE 1
2. ESSAY FROM MODULE 1
3. ESSAY FROM MODULE 2

Part-B

4. ESSAY FROM MODULE 3
5. ESSAY FROM MODULE 4
6. ESSAY FROM MODULE 5

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. SHORT FROM MODULE 1
8. SHORT FROM MODULE 2
9. SHORT FROM MODULE 2
10. SHORT FROM MODULE 3
11. SHORT FROM MODULE 3
12. SHORT FROM MODULE 4
13. SHORT FROM MODULE 5

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 6C: Web of Things Lab				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	HTML	0	0	3	2

Objectives

1. The W3C Web of Things (WoT) is intended to **enable interoperability across IoTplatforms and application domains**.
2. Overall, the goal of the WoT is to preserve and complement existing IoT standards andsolutions

List of Experiments

1. Polling Data from WoT Sensor
2. Create your Own form to Control your devices in WoT
3. Installing Node.js in RPi
4. Read the Sensor data as JSON
5. Accessing GPIOs with Nodejs
6. Implementing the Web Thing Model on the Pi
7. Web Control using MQTT
8. Implementing a Social WoT authentication proxy
9. Pushing intruder alert tweets to a Google spreadsheet

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 7C: Security in IoT				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Foundations of IoT	3	1	-	3

Course Objectives:

1. The overall goal is **to protect the entire system which represents an IoT installation**.
2. The more granular security requirements, often called security attributes, are confidentiality,availability, integrity, and privacy

Course Outcomes:

Students after successful completion of the course will be able to:	
CO1	Understand the Security requirements in IOT.
CO2	Understand the cryptographic fundamentals for IOT.
CO3	Understand the authentication credentials and access control.
CO4	Understand the various types Trust models and Cloud Security

Syllabus:

Unit-1: (10 hours)

Data & Network Security: Need for Security, Security Attack, Security Services, Information Security, Methods of Protection, and Basics of Cryptography: Terminologies used in Cryptography, Substitution Techniques, Transposition Techniques, Network Security, Threats in Networks, Network Security Controls.

Unit-2: (10 hours)

Securing the Internet of Things: Security Requirements in IOT Architecture, Security in Enabling Technologies, Security Concerns in IOT Applications, Security Architecture in the Internet of

Things, Security Requirements in IOT and challenges, Authentication and Authorization in IOT, Access Control in IOT, Threats to Access Control, Privacy, and Availability, Attacks Specification IOT, Vulnerability and Risk in IOT, Attack and Counter measures.

Unit-3: (10 hours)

Cryptographic Fundamentals for IOT: Cryptographic primitives and its role in IOT, Encryption and Decryption, Hashes, Digital Signatures, Random number generation, Cipher suites, key management fundamentals, cryptographic controls built into IOT messaging and communication protocols, IOT Node Authentication

Unit-4: (10 hours)

Identity & Access Management Solutions for IOT: Identity lifecycle, authentication credentials, IOT IAM infrastructure, Authorization with Publish / Subscribe schemes, access control

Privacy Preservation and Trust Models for IOT: Concerns in data dissemination, Lightweight and robust schemes for Privacy protection, Trust and Trust models for IOT, self-organizing Things, Preventing unauthorized access.

Unit-5: (10 hours)

Cloud Security for IOT: Cloud services and IOT, offerings related to IoT from cloud senrice providers, Cloud IOT security controls, An enterprise IOT cloud security architecture, New directions in cloud enabled IoT computing.
Web Security**:** Web Security Requirements, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction (SET).

References

1. William Stallings, "Network Security Essentials: Applications and Standards", Prentice Hall,4th edition,2010.
2. Madhusanka Liyanage, An Braeken, Pardeep Kumar, Mika Ylianttila, "IoT Security: Advances in Authentication", Wiley Publishers, 2019.
3. Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations.
4. Michael T. Goodrich and Roberto Tamassia, "Introduction to Computer Security", AddisonWesley,20ll.
5. Brian Russell, Drew Van Duren, “Practical Internet of Things Security", Packt Publication,

2016

6. Web resources:

https://online.stanford.edu/courses/xee100-introduction-internet-things

7. Other web sources suggested by the teacher concerned and the college librarianincluding reading material.

Co-Curricular Activities:

a) **Mandatory:** *(Training of students by teacher in field related skills: (lab: 10 + field: 05) :*

1. For Teacher: Field related training of students by the teacher in laboratory/field for not less than 15 hours to develop the programs to encrypt/decrypt the data collected by the IoT device with various algorithms.

2. For Student: Students shall (individually) search for potential threats/attacks to the IoT devices and its countermeasures online and and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages.

3. Max marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place or websites visited, structure of thewebsite and acknowledgements*.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Arrange expert lectures by IT experts working professionally in the area of Cyber Security.
2. Assignments (in writing or implementing contents related to syllabus or outside thesyllabus.Shall be individual and challenging)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Awareness Programs by students to community about Cyber Security in daily life

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
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Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
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UNIT-2	1	2	20
UNIT-3	1	2	20
UNIT-4	1	1	15
UNIT-5	1	1	15
Total No. of questions	6	7	
Total Marks Including choice			95

PITHAPUR RAJAH'S GOVT DEGREE COLLEGE (AUTONOMOUS), KAKINADA
(Accredited by NAAC "A" Grade)

III B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023) PAPER-
IoT 122- 7C: Security in IoT

SEMESTER – V

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

SECTION – I

Answer any three of the following questions. Must attempt atleast one question from each part . Each question carries 10 Marks. **(3x10=30M)**

Part-A

1. ESSAY FROM MODULE 1
2. ESSAY FROM MODULE 1
3. ESSAY FROM MODULE 2

Part-B

4. ESSAY FROM MODULE 3
5. ESSAY FROM MODULE 4
6. ESSAY FROM MODULE 5

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. SHORT FROM MODULE 1
8. SHORT FROM MODULE 2
9. SHORT FROM MODULE 2
10. SHORT FROM MODULE 3
11. SHORT FROM MODULE 3
12. SHORT FROM MODULE 4
13. SHORT FROM MODULE 5

	PITHAPUR RAJAH'S GOVRNMENT COLLEGE (Autonomous), KAKINADA	Program & SemesterIII B.Sc. M.E.IoT (V Sem)			
Course Code	**TITLE OF THE COURSE** 7C: Security in IoT Lab				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:		0	0	3	2

Objectives

1. The overall goal is **to protect the entire system which represents an IoT installation**.
2. The more granular security requirements, often called security attributes, are confidentiality, availability, integrity, and privacy

List of Experiments

8. Write Python/Java Program for Substitution Ciphers
9. Write Python/Java Program for Transposition Ciphers
10. List out various IoT attacks and Countermeasures
11. Implement Hash algorithms on the Sensor collected data before sending to the Cloud
12. Implement Digital Signature on the Sensor collected data before sending to the Cloud
13. Implement MQTT with Mosquitto in RPi and explore Various Security features of MQTT protocol
14. Demonstrate AWS IoT Security