

P.R. GOVT. COLLEGE (A)

KAKINADA

Affiliated to Adikavi Nannaya University

Rajamahendravaram



DEPARTMENT OF COMPUTER SCIENCE

CBCS (CLUSTER PATTERN)

BOARD OF STUDIES

2023-2024

**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.1/A.C/BOS/2023-24

Dt. 29 Aug 2023

Sub: P.R.G.C[A]–Academic Cell- **Conduct of BOS Meetings for the Academic Year 2023-24**–Guidelines issued–Regarding.

Ref: Resolutions adopted in 25th Staff Council Meeting held on 29 Aug 2023

The Autonomous colleges are, as per its vision, mission, stated objectives and core values, and are to 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 equip students with such skills that translate them into leaders and potential entrepreneurs too besides credit transfer mechanism through ABC (Academic Bank of Credits).

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 by facilitating the students experience a wide range of participative and experiential learning strategies including field trips, conferences, integration of technology, community service programmes, career guidance, certificate and value added courses, research and inquiry based teaching, exchange programmes, gender equity programmes, etc.

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.

Our institution has, from AY 2022-23, 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 institutions vision and mission, SDG-4, NEP – 2020, NAAC, NIRF to the autonomous HEIs, need to customize, design and re-orient their academic and research administration in tune with the policies of above bodies, our institution is no exception.

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 on **31 August 2023**. 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 and a 21st century student capable of facing challenges, adaptive to changes, creative and innovative.

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 60% for I mid-term examination, 75% for II mid-term examination 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 2023-24, if any, number of certificate courses, their frequency, Bloom's-Taxonomy based evaluation system for effective learning outcomes as per the Annexure-I.

The Chairmen are, therefore, requested to

- Design curricula of Odd and even semesters for the A.Y 2023-24 both for U.G and P.G courses in tune with the state division, mission of the institution, RA of NAAC, NEP-2020 and NIRF.
- 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.
- 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 state 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 coordinator conducted a meeting with the Chairmen, BOS on 28 August 2023 and explain the structure of curricula, uniformly 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 Chairman ship, he/she shall be given advance amount equivalent to the number of courses x Rs.500/-)
- 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).

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 in case 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 in 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
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 (2023-24 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 **4units**

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

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

➤

S. No	Unit No	Long Answer Question(10M)	Short Answer Question(5M)	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 weight age	1

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

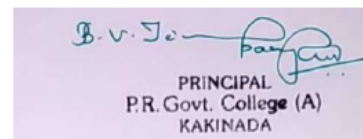
Project-10M	Viva on theory-3M	Assignment-5M	Seminar-5M	Clean & green and Attendance-2M
-------------	-------------------	---------------	------------	---------------------------------

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-contentlinks.



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 2022-2023

The nineteenth meeting of Board of Studies **COMPUTER SCIENCE** has been conducted in the Department of Computer Science on 31 AUG, 2023 to discuss the following.

AGENDA

1. Department activities for 2023-24 academic year.
 2. Organizing National/State level Seminars / Workshops / Conferences / /Training programmes etc., with topics and other details
 3. Plan for utilization of funds for Autonomous/CPE/other grants available for arranging guest lecturers, faculty improvement programmes, study tours, equipping laboratories, reference books & other necessary teaching-learning material.
 4. Plan for organizing subject oriented community outreach programmes & allocation of necessary funds.
 5. Institution of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc.,
 6. Any other programme that enhances the learning capacity of students and their employable & knowledge skills.
 7. Suggest panel of examiners / paper setters & other experts / nominees for BOS deliberations.
 8. Pedagogy implementation w.e.f. admitted batch 2023-24
 9. Internal Assessment weight age 50% for I Year ,II Year and III Year students
 10. End Semester Examinations for 50 marks for I Year, II Year and III year students.
 11. Conduct practical examination semester wise for three years.
 12. Encourage students to take-up certificate courses from AWS
 13. IOT syllabus for I , II and III year students may be followed as framed by CCE AP
 14. Any other issues with the permission of chair
-

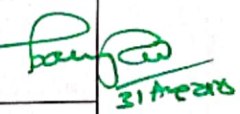
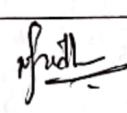
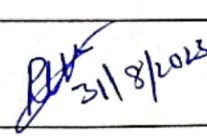
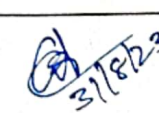
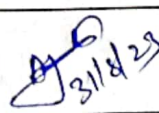
RESOLUTIONS

1. The nineteenth meeting of Board of Studies **COMPUTER SCIENCE** has been conducted in the Department of Computer Science on 31st Aug 2023 and adopted the following resolutions.
 2. Program Specific Outcomes of Artificial Intelligence and IoT programmes discussed and approved.
 3. Course Outcomes of Artificial Intelligence and IoT programme courses discussed and approved
 4. Resolved to approve the curriculum, and academic activities of Artificial Intelligence and IoT programme for the academic year 2023-24.
 5. Approved Blue Prints, Model Question Papers, and Question Banks for all UG Programs (I, II and III Years) in alignment with Bloom's Taxonomy
 6. Approved Scheme of Evaluation for Internal and External Evaluation for I, II and III Years (50:50 pattern)
 7. Resolved to approve Revised Panel of Question Paper Setters and Examiners
 8. Resolved to approve department action plan-2023-24
 9. The syllabus of new certificate course on Amazon web services discussed and approved
 10. Approved the inclusion of additional inputs as necessary to each course for further extension of student knowledge
-

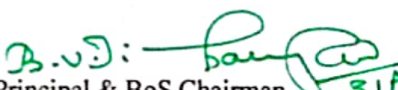
DEPARTMENT OF COMPUTER SCIENCE

CONSOLIDATED REPORT OF BOARD OF STUDIES FOR THE YEAR 2023-24

The Board of Studies meeting of Computer Science department was convened on 31 Aug 2023 under the Chairmanship of Dr B V Tirupanyam, Principal and Lecturer-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. Dr. B V Tirupanyam In-Charge, Dept. of Computer Science P. R. Govt. College (A), Kakinada	Chair Person	B.V.T:  31/8/23
2	Smt. N. Nagasubramanyeswari Lecturer in Computer Science A.S.D.Govt degree college for women (A) , Kakinada	University Nominee	N.N.S. Esuvaru 31/8/23
3	Dr. N Sridhar Lecturer in Computer Science Government Degree College, Tuni	Subject expert	
4	Sri D.Suneel Kumar, Lecturer in Computer Science Govt.Degree College (A), Rajamhaendravaram	Subject expert	 31/8/23
4	Sri. P. S. R. Subrahmanyam, Rtd. HOD of Mathematics, Ideal College of Arts & Science (A), Kakinada	Alumni Member	
5	Sri A Siva Kumar Developer TCS,Hyderabad	Industry Expert	
6	Sri. R V Satyanarayana Lecturer in Computer Science P R Govt. College(A),Kakinada	Member	 31/8/2023
7	Miss. G Aneetha Lecturer in Computer Science P R Govt. College(A),Kakinada	Member	 31/8/23
8	Sri Anantha teja Lecturer in Computer Science P R Govt. College(A),Kakinada	Member	 31/8/23

9	Miss .K.Manisha Lecturer in Computer Science P R Govt. College(A),Kakinada	Member	K. Manisha
10	Sri.Ch.Manohar Lecturer in Computer Science	Member	Ch. Manohar
11	V.Akhieswari	Student Member II B.SC-M.S.C.S	V. Akhieswari
12	N.Siva kumari	Student Member II B.sc -M.P.C.S	
13	K. Lakshmi Durga	Student Member III B.Sc. M.E.Cs	K.L Durga
14	A.Alekya	Student Member III B.sc -M.E.C.S	A. Alekya
15	A.S.L.Sravanthi	Student Member III B.sc-M.C.C.S	A.S.L.Sravanthi
16	P.Nani Babu	Student Member II B.Sc. MEIOT	P. Nani Babu
17	M.Venkatesh	Student Member II B.Sc. MEIOT	M. Venkatesh
18	B.Sai Yeshwanth	Student Member I B.Sc. M.S.C.S	B.S. Yashwanth
19	Ch.Gayathri	Student Member I B.Sc. M.S.C.S	Ch. N. R. L. Gayathri

B.V.D: 
Principal & BoS Chairman
P.R.GOVERNMENT COLLEGE (A)
KAKINADA

MEMBER PRESENT

**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), Visakhapatnam
6	Sri. D. V. Raghava Swamy	Dr VS Krishna G.D.C.(A), Visakhapatnam
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 INTELLIGENCE

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
3	Life Skill Course		Digital Literacy	2	50	--	50	2
			Phase – I CSP		100			4

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

S.No .	Semester	Course Code	Title of the Course (Paper)	Hrs/ Week	Max Marks (SEE)	Marks in CIA	Total	Credits
3	SEM-III		Data Base Management Systems	4	50	50	100	3
			Data Base Management Systems lab	2	50	--	50	2
4.	SEM IV		Object oriented programming using java	4	50	50	100	3
			Object oriented programming using java lab	2	50	--	50	2
			Operating Systems	4	50	50	100	3
			Operating Systems Lab	2	50	--	50	2

			Phase II Internship (2 months)		100		100	4
5	SEM-V	6A	Web Interface Designing Technologies	4	50	50	100	3
			Web Interface Designing lab	2	50	--	50	2
6		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
	SEM VI		Phase III Apprenticeship (6 months)		150	50	200	12
19	SEM I	Life skills 1	Basics of Computer Applications	2	50		50	2
20	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 2023-24
SUMMARY OF CHANGES IN SYLLBUS

Semester	Title of the Course(Paper)	Changes
SEM-I	Essentials and applications of mathematical, physical and chemical sciences	100 (New Course Introduce)
	Advances in mathematical, physical and chemical sciences	100 (New Course Introduce)
SEM-II	Python for data science	100 (New Course Introduce)
	Statistical methods and probability distribution	100 (New Course Introduce)
SEM-III	Data Base Management Systems	Introduced Indexes as additional topic. Removed DBMS Approach, PL/SQL packages.
SEM-IV	Object orientated Programming through java	Removed Applets as this is age old concept. Removed the Deadlocks and Daemon threads and thread communication concepts. Removed Zip/Unzip, Serialization Concepts, Added: Event handling, and JDBC concept
SEM IV	Operating Systems	Added : Android OS
SEM V	Web Interface Designing Technologies	Added: Introduction to JQuery added as Additional input
SEM V	Web Application development using PHP & MYSQL	Nil

B. Sc. IOT

Courses for the Academic Year 2023-24

COURSE STRUCTURE OF COMPUTER SCIENCE(IOT)

S.No	Semester	Course Code	Title of the Course(Paper)	Max Marks(SEE)	Marks in CIA	Hrs/Week			
						L	T	P	C
1	SEM- I		Essentials and Applications of Mathematical, Physical and Chemical Sciences	50	50	3+2			4
			Advances in Mathematical, Physical and Chemical Sciences	50	50	3+2			4
	SEM- II		Fundamentals of Computer and C –Programming	50	50	3	0	-	3
2			C Programming Lab	50	--	-	-	3	2
3			Fundamentals of IOT and Applications	50	50	3	1	-	3
4			Arduino Programming Lab	50	--	-	-	2	1
			Phase – I CSP		100				4

B.Sc. Computer Science(IOT)

Courses for the Academic Year 2022-23

COURSE STRUCTURE OF COMPUTER SCIENCE(IOT)

5	SEM-III		Data Communications & Computer Networks	50	50	3	1	-	3
6			Network Simulation Lab	50	--	-	-	3	2
7	SEM-IV		RFID and Sensor Networks	50	50	3	1	-	3
8			Network Simulation Lab using NS2/NS3	50	--	-	-	3	2
9			Implementing IOT with RaspberryPi	50	50	3	1	-	3
10			RaspberryPi Lab	50	--	-	-	3	2
11			6A:Machine Learning for IOT	50	50	3	1	-	3
12			Machine Learning for IOT Lab	50	--	-	-	3	2
13			7A:Computer Vision	50	50	3	1	-	3
14			Computer Vision Lab	50	--	-	-	3	2

Elective- A

15	SEM-V		6B: Java Programming for IOT	Elective- B	50	50	3			3
16			Java Programming for IOT Lab		50	0			3	2
17			7B:Big Data and Analytics		50	50	3			3
18			Big Data and Analytics Lab		50	0			3	2
19			6C:Web of Things	Elective-C	50	50	3			3
20			Web of Things Lab		50	0			3	2
21			7C: Security in IOT		50	50	3			3
22			Security in IOT Lab		50	0			3	2

L=Lecture, T=Tutorial, P=Practical, C=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

B.Sc. (Hons.) Artificial Intelligence

Program Specific Out comes(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 Disney' (2 Cr)			Skill Enhanceme nt 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 in these areas, enabling them to apply scientific principles to real-world situations.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
CO2	To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations
CO3	To explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.
CO4	Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical 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,classification of matter,Biomolecules-carbohydrates,proteins, fats and vitamins.

UNIT-IV

APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:

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

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, 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
C01													
C02													
C03													
C04													
C05													

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	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 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-	
C01	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.
C02	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.
C03	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.
C04	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.
C05	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 intersection of two straight lines

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

Integration: Integration as reverse process of differentiation–Basic methods of integration

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

UNIT-II

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

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

UNIT-III

ADVANCES IN CHEMISTRY:

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

UNIT-IV

ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Mathematical 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. Loney, 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-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
C01													
C02													
C03													
C04													
C05													

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(II 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 p and as 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. **Python Programming Using Problem Solving Approach**–
Reema Thareja'aOxfordUniversityPress,©2017
2. **Pandas for Everyone (Python data Analysis)**-
Daniel Y.Chen,Pearson Addison Wesley Data and Analytics series,©2018

Reference books:

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)

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	PS01	PS02	PS03
C01													
C02													
C03													
C04													
C05													

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 – 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. 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
-

CourseOutcomes:

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.

@@@@

	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

CourseObjectives:

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

CourseOutcomes:

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(3variables only) and Logistic Regression

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.

Unit V

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-Simple 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. Gupta and V.K. Kapoor, Sultan Chand & Sons, New Delhi.

2. Fundamentals of Applied Statistics, 4th Edition 1st January 2014, (ISBN 108180547051) S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons, New Delhi.
3. Mathematical Statistics with Applications, 2009, K.M. Ramachandran and Chris P. Tsokos Academic Press (Elsevier), Haryana.
4. Probability and Statistics, Volume I, D. Biswas, New Central Book Agency (P) Ltd, New Delhi
An outline of Statistical theory, Volume Two, 3rd Edition, 2010 (with corrections)
5. A.M. Goon, M.K. Gupta, B. Dasgupta, The World Press Pvt. Ltd., Kolkata.
6. Sanjay Arora and Bansilal: New Mathematical Statistics, Satya Prakashan, New Delhi.

WebLinks:

1. <http://onlinestatbook.com/rvls/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
C01													
C02													
C03													
C04													
C05													

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)			
CourseCode	TITLEOF THE COURSE STATISTICAL METHODS AND PROBABILITY DISTRIBUTION				
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,frequeuncypolygon,andOgivecurves
2. Computationofmeasuresofcentraltendency-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, β_1 and β_2 andSheppard'scorrectionsforgroupeddata.
6. Computation of Karl Pearson's coefficients, Bowley's coefficients of Skewness and coefficients of Skewness based on moments-GroupedData

7. Computation of correlation coefficient and regression lines for (i) ungrouped data (ii) grouped bivariate data
8. Construction regression line equations for (i) ungrouped data (ii) grouped bivariate data.

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

Reference Manual: Practical Manual-Prepared by the Department Faculty Members

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 information of interest

CO3: Register for an E-mail account and operating it

CO4: Make bill payments and use other applications of Internet

CO5: Create, edit and format documents using a word processor

CourseDuration:30Hours

Credits:2

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

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. (CS)-SEMESTER-III
Data Base Management System

Course Objective:

Design & develop database for large volumes & varieties of data with optimized data processing techniques.

Course Outcomes:

On completing the subject, students will be able to:

- Explain the basic concepts of databases, data models, database architecture and development steps.
 - Design and implement properly structured databases that match the standards based under realistic constraints.
 - Comprehend how to use Structured Query Language (SQL) to define and manipulate database information
 - Write Relational Algebra and Relational Calculus queries
 - Apply various Normalization techniques to improve database design.
-

UNIT I

Overview of Database Management System: Introduction, file-based system, Drawbacks of file-Based System, Data and information, Database, Database management System, Objectives of DBMS, Evaluation of Database management System, Classification of Database Management Systems, DBMS Approach, advantages of DBMS, data models, Components and Interfaces of Database Management System. Database Architecture, Situations where DBMS is not necessary.

UNIT II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree,

relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, **IS A** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, aggregation and composition, entity clusters, connection types, advantages of ER modeling.

UNIT III

Relational Model: Introduction, Codd Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC).

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3NF), Boyce-Codd normal form (BCNF)

UNIT IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Table Truncation, Imposition of Constraints, Join Operation, Set Operation, View, Sub Query, **Embedded SQL**.

UNIT V

PL/SQL: Introduction, Shortcoming in SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL Program, Iterative Control, Cursors, Steps to create a Cursors, Procedure, Function, **Packages**, Exceptions Handling, Database Triggers, Types of Triggers.

Additional Inputs:

Transaction management and Concurrency control: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, database recovery management.

Reference Books

1. “Database System Concepts” by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010,9780073523323
 2. “Database Management Systems” by Raghu Ramakrishnan, McGrawhill,2002,
 3. Fundamentals of Relational Database Management Systems by S. Sumathi,S. Esakkirajan, Springer Publications
 4. “An Introduction to Database Systems” by BipinCDesai
 5. “Principles of Database Systems” by J. D.Ullman
 6. “Fundamentals of Database Systems” by R. Elmasri and S.Navathe
-

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

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc.(CS)-SEMESTER-III
Data Base Management System

Time: 2¹/₂Hrs

Max. Marks:50

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 data model? Explain different data models in DBMS.
2. What is E-R diagram? What are the building blocks of E-R diagram?
3. Explain about different joins in SQL?

Part-B

4. Explain components and interfaces of DBMS?
5. Explain Codd's relational database rules?
6. Explain about PL/SQL block structure in detail?

SECTION - II

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

4 X 5 = 20M

7. Explain roles and responsibilities of DBA?
 8. Write about attribute classification in ER Model
 9. What is weak entity? Explain with suitable example.
 10. Compare and contrast relational algebra and relational calculus.
 11. Explain aggregate functions in SQL
 12. Explain join operations in SQL
 13. Explain conditional statements in PL/SQL.
-

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. (CS)-SEMESTER-III
DATABASE MANAGEMENT
SYSTEMSLAB

1. Draw ER diagrams for train services in a railway station
 2. Draw ER diagram for hospital administration
 3. Creation of college database and establish relationships between tables
 4. Write a view to extract details from two or more tables
 5. Write a stored procedure to process students results
 6. Write a program to demonstrate a function
 7. Write a program to demonstrate blocks, cursors & database triggers.
 8. Write a program to demonstrate Joins
 9. Write a program to demonstrate sub-queries
 10. Write a program to demonstrate of Aggregate functions
 11. Creation of Reports based on different queries
 12. Usage of file locking table locking, facilities in applications.
-

SEMESTER-IV

P R GOVT COLLEGE(A), KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc (CS) -Semester- IV(W.E.F. 2020-2021)
OBJECT ORIENTED PROGRAMMING USING JAVA

Total Hrs. of Teaching-Learning: 60 @ 4 h / Week

Total Credits: 03

Objectives:

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

Course Learning Outcomes: At the end of this course student will:

1. Understand the benefits of a well-structured program
2. Understand different computer programming paradigms
3. Understand underlying principles of Object-Oriented Programming in Java
4. Develop problem-solving and programming skills using OOP concepts
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java

UNIT – I

Introduction to Java: Features of Java, The Java virtual Machine, Parts of Java

Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals

Operators in Java: Operators, Priority of Operators

Control Statements in Java: if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement

Input and Output: Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.println(), Displaying Formatted Output with String.format()

Arrays: Types of Arrays, Three Dimensional Arrays (3D array), array name.length, Command Line Arguments

UNIT – II

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings

Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object-Oriented Programming System (OOPS)

Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword „this“, Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods

Inheritance: Inheritance, The keyword „super“, The Protected Specifier, Types of Inheritance

UNIT – III

Polymorphism: Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

Type Casting: Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class

Abstract Classes: Abstract Method and Abstract Class

Interfaces: Interface, Multiple Inheritance using Interfaces

Packages: Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document

UNIT – IV

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception

Threads: Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Thread Priorities, Applications of Threads, Thread Life Cycle

UNIT – V

Streams: Stream, Creating a File using File Output Stream, Reading Data from a File using File Input Stream, Creating a File using File Writer, Reading a File using File Reader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

Additional Inputs: _____

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, , Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements, Using jdbc-odbc Bridge Driver to Connect to Oracle Database, , Retrieving Data from MS Access Database, Stored Procedures and Callable Statements, Types of Result Sets.

Prescribed Book:

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

Reference Books:

1. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TMH.
 2. Deitel&Deitel. Java TM: How to Program, PHI (2007)
 3. Java Programming: From Problem Analysis to Program Design- D.S Mallik
 4. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)
 5. Java complete reference.
-

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2020-2021)
II B.Sc (CS) SEMESTER-IV

SUBJECT:OBJECT ORIENTED PROGRAMMING USING JAVA
PAPER- IV

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 Part A and Part B Essay Questions	3+3	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.GOV.T.COLLEGE (AUTONOMOUS), KAKINADA
MODEL PAPER (W.E.F. 2023-2024)
II B.Sc (CS)
SEMESTER-IV

SUBJECT: OBJECT ORIENTED PROGRAMMING USING JAVA
PAPER-IV

Time: 2.00Hrs
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. Explain the features of Java?
2. Explain about Object Oriented Principles?
3. Explain different types of JDBC drivers?

Part-B

4. What is an Operator? Explain the Types of Operators in Java.
5. Explain how Multiple Inheritance is implemented in Java?
6. Explain the Life cycle of Thread?

SECTION - II

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

7. What are the Data types supported by Java?
 8. Explain about Constructors in Java?
 9. Explain types of Inheritance in Java?
 10. Explain about Abstract Method and Abstract Classes?
 11. Explain about File Input Stream and File Output Stream?
 12. Explain about Thread priority?
 13. Explain about JDBC?
-

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT (W.E.F. 2023-2024)
II B.SC (CS)
SEMESTER-IV

[illegible]

Model Blue print for the question paper setter

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

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc (CS)-SEMESTER-IV
OPERATING SYSTEM (PAPER-V)

Objectives:

This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management, etc.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

1. Know Computer system resources and the role of operating system in resource management with algorithms
2. Understand Operating System Architectural design and its services.
3. Gain knowledge of various types of operating systems including Unix and Android.
4. Understand various process management concepts including scheduling, synchronization, and deadlocks.
5. Have a basic knowledge about multithreading.
6. Comprehend different approaches for memory management.
7. Understand and identify potential threats to operating systems and the security features design to guard against them.
8. Specify objectives of modern operating systems and describe how operating systems have evolved over time.
9. Describe the functions of a contemporary operating system

UNIT- I

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

UNIT- II

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

UNIT III

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

Concurrent and Dependent Processes, Critical Section, Semaphores, and Methods for Inter-

process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer. Case studies: linux, windows

UNIT IV

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

UNIT V

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

Additional topic:

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

REFERENCE BOOKS:

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

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 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 and contribution of students shall be ensured (team activity)

B. General

1. Group Discussion
 2. Try to solve MCQ's available online.
 3. 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 from individual and collaborative work.
-

Operating Systems Lab

Objectives:

- To use linux operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems

Outcomes:

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.

List of Experiments:

1. Usage of following commands
Ls,pwd,tty,cat,who,who am I,rm, mkdir,rmdir,touch,cd.
 2. Usage of following commands
Cal,cat(append),cat(concatenate),mv,cp,man,date.
 3. Usage of following commands
Chmod,grep,tput(clear,highlight),bc.
 4. Write a shell script to check if the number entered at the command line is Prime or not
 5. Write a shell script to modify "cal" command to display calendars of the specified months.
 6. Write a shell script to modify "cal" command to display calendars of the specified range of months.
 7. Write a shell script to accept a login name. If not a valid login name display message "entered login name is invalid"
 8. Write a shell script to display date in the mm/dd/yy format.
 9. To implement the FCFS Algorithm.
 10. To implement the shortest job First Algorithm.
 11. To implement the priority algorithm.
 12. To implement the round robin Algorithm.
 13. To implement the FIFO page replacement algorithm
-

P. R.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2023-2024
II B.SC (CS) 2022-2025 BATCH
SEMESTER-IV

SUBJECT: OPERATING SYSTEMS
Time: 2.00Hrs

PAPER: V
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 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

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

PR GOVT COLLEGE (A):: KAKINADA
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc(CS)-SEMESTER-IV
Paper-IV: Operating Systems

Time:2 .00 Hrs

Max. Marks: 50

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 Operating System? Explain functions of Operating System.
2. Explain about Process Scheduling Algorithms in detail?
3. Explain about Deadlock Detection and recovery?

Part-B

4. Explain the various types of Operating System?
5. Explain about classical Process Synchronization problems?
6. Explain about Segmentation and Memory Allocation Strategies?

SECTION – II

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

7. Explain Real Time System and Time sharing Operating System?
 8. Write about Resource Abstraction?
 9. Write about the Process and the Process state?
 10. Explain Threading issues?
 11. Write about some necessary and sufficient conditions for Deadlock?
 12. Explain about Virtual memory?
 13. Write about file Operations?
-

P. R.GOV'T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR MODULE_WISE FOR THE YEAR 2023-2024
II B.SC (CS) 2022-2025 BATCH
SEMESTER-IV
Operating Systems

Time: 2.00 Hrs.

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 Sanda S.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 and identify anyone case study 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 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 with 10 pages for the case study identified.
 2. Training of students by related industrial experts.
 3. Assignments
 4. Seminars, Group discussions, Quiz, Debates etc.(on related topics).
 5. Presentation by students on best websites.
-

P. R.GOV.T. 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
Max. Marks: 50

Time: 2 Hrs
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

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

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:

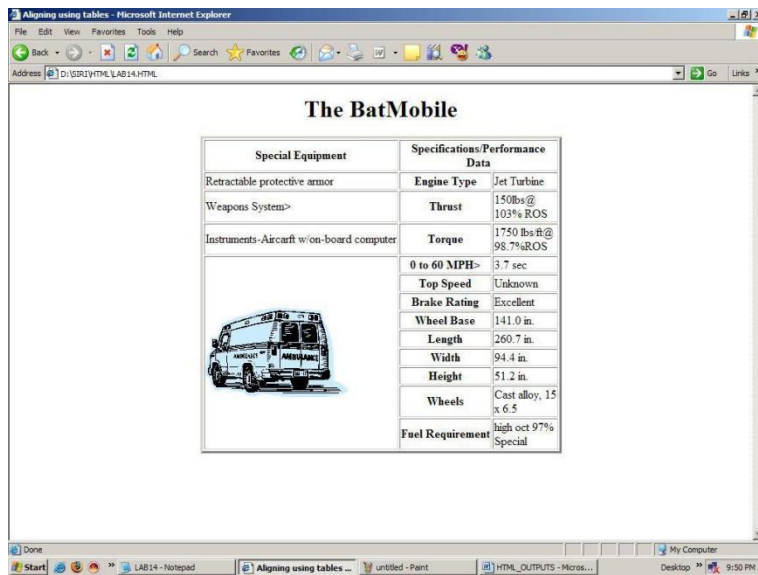
1. Create an HTML document with the following formatting options:
(a) Bold, (b) Italics, (c) Underline, (d) Headings (Using H1 to H6 heading styles),
(e)Font(Type,SizeandColor),(f)Background(Coloredbackground/Imageinbackground),(g)Parag
raph,(h)LineBreak,(i)Horizontal Rule,(j) Pre tag
2. Create an HTML 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 MYSQL.
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.GOV.T. 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
Max. Marks: 50

Time: 2 Hrs.
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

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

**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 and M2M.

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, Raspberry Pi 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: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet And Mod bus.

IP Based Protocols for IoT: IPv6, 6LoWPAN, LoRA, RPL, REST, AMQP, 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, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino 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)", 1st Edition, VPT, 2014
 3. 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
 4. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, 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> (Mobile app)
 - 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 and submit a hand-written Fieldwork/Project work/Project work/Project work/Project work Report 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
Max. Marks: 50

Time: 2 Hrs
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

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

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, Web 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. Core 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 15hours on field related skills like building an IOT device with the help of Python.
 2. **For Student:** Students shall (individually) identify 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.GOV.T. 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
Max. Marks: 50

Time: 2 Hrs
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

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

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 python 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 < 80 Grade C:
Percentage ≥ 60 and < 70 Grade D:
Percentage ≥ 40 and < 60 Grade E:
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 $t \geq 0$.
 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 for the 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 ($s=ut+0.5at^2$)
 - III. distance wrt velocity ($s=(v^2-u^2)/2a$)
 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 and 5th 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 5 lines 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 Science!

Visualizing Data : Matplotlib, Bar charts, Line charts, Scatter plots.

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/B Test, 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](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 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, analyzing and presenting the data and then to predict the future instances.

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.GOV.T. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT FOR THE YEAR 2023-2024
III B.SC (CS) 2021-2024 BATCH
SEMESTER-V

SUBJECT: 6C Data Science
Max. Marks: 50

Time: 2 Hrs
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

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

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:

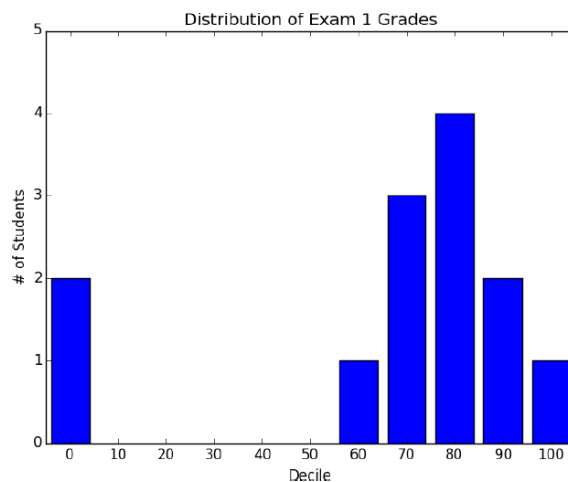
1. Apply data science solutions to real world problems.
2. Implement the programs to get the required data, process it and present the outputs using Python language.
3. Execute statistical analyses with Open source Python software.

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. height. 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 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 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.GOV.T. 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
Time: 2 Hrs

PAPERS: VII
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

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

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

IoT

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 in these areas, enabling them to apply scientific principles to real-world situations.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
CO2	To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations
CO3	To explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.
CO4	Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical 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,classification of matter,Biomolecules-carbohydrates,proteins, fats and vitamins.

UNIT-IV

APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:

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

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, 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
C01													
C02													
C03													
C04													
C05													

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	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 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-	
C01	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.
C02	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.
C03	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.
C04	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.
C05	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 intersection of two straight lines

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

Integration: Integration as reverse process of differentiation–Basic methods of integration

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

UNIT-II

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

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

UNIT-III

ADVANCES IN CHEMISTRY:

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

UNIT-IV

ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Mathematical 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. Loney, 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-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
C01													
C02													
C03													
C04													
C05													

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 GOVERNMENT 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 UNIVERSITY PRESS
2. E Balagurusamy: —COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-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>

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

P R GOVT COLLEGE (A), KAKINADA

I B.Sc –MEIOT / Semester- II (W.E.F. 2023-2024)

Course: Fundamentals of Computer and C –Programming

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. Explain about various components of computer and draw the blockdiagram?
2. What are the generations of computers?
3. What is operator? Explain different types of operators in C?

Part-B

4. Explain about conditional control statements in C?
5. Explain about functions in details?
6. What is a pointer? Explain the types of pointers?

SECTION-II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. Types of Software?
8. What is Identifier? Explain with example
9. What is switch statement? Write its syntax?
10. Explain about Break and continue?
11. What are the different storage classes?
12. What is dynamic memory allocation?
13. Explain about pointer data types?

	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester I B.Sc. M.E.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	3	2

Objectives:

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

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 value supplied 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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester I B.Sc. M.E.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, AMQP, CoAP, MQTT. Edge connectivity and protocols

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. Hakima Chaouchi, — —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, Wiley Publications
3. Vijay Madisetti and Arshdeep Bahga, — —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, Wiley Publications

- Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press

Web Links:

- https://onlinecourses.nptel.ac.in/noc17_cs22/course
- 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 & APPLICATIONS

PAPER – II: IoT106: Fundamentals of IoT and Applications

MODEL QUESTION PAPER (W.E.F 2022-2023)
SEMESTER – II

Time: 2Hours

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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester I B.Sc. M.E.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 Arduino MicroController

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 Reference by J. M. Hughes

Virtual LabLinks:

1. <https://www.tinkercad.com/>



	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE Data Communications & Computer Networks	II B.Sc. M.E.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 / equipments 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
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

P R GOVT COLLEGE (A), KAKINADA

II B.Sc –MEIOT / Semester- III(W.E.F. 2021-2022)

Course: Data Communications & Computer Networks

SEMISTER – III

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. Explain the functions of various layers of OSI model?
2. Explain various Network topology
3. Explain GO-Back-N-ARQ

Part-B

4. Explain the transmission of Digital Signals
5. What is Random access? Explain about CSMA/CD protocols?
6. Explain Back bone networks

SECTION – II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. Explain various types of networks?
8. What are the TCP/IP utilities?
9. What is the need for FRAMING?
10. Explain the difference between FDMA and CDMA?
11. Explain about transition from IPv4 to IPv6
12. Explain IEEE standards?
13. Explain the types of Routing protocols?

	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester I B.Sc. M.E.IoT (III Sem)			
Course Code	TITLE OF THE COURSE Network Simulation Lab				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	Data Communications	0	0	3	2

Objectives:

1. To understand the functioning of various protocols in Wired and Wireless Environment.
2. To perform real time experimentation using the existing infrastructure.
3. To impart programming to construct LAN, WLAN , and VLAN in a real- time environment.

List of Experiments (NS2/QUALNET/BWSIM/MATLAB)

1. Study Of Network Simulator (NS-2)
2. Simulation of Four Node Point To Point Network
3. Transmission Of Ping Message
4. Implement Bus Topology
5. Implement Star Topology
6. Simulation of Stop and Wait, Sliding Window Protocols
7. Simulation of Distance vector routing algorithm
8. Simple ESS With Wireless LAN

Reference books:

1. Teerawat Issariyakul and Ekram Hossain. 2011. Introduction to Network Simulator NS2 (2nd.ed.). Springer Publishing Company, Incorporated.
2. <http://www.mathcs.emory.edu/~cheung/Courses/455/Syllabus/A3-NS/Book/Introduction-to-Network-Simulator-NS2-2012.pdf>

Virtual LabLinks:

1. <http://vlabs.iitkgp.ac.in/ant/1/theory/>



	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester II B.Sc. M.E.IoT (IV Sem)			
Course Code	TITLE OF THE COURSE RFID and Sensor Networks				
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Data Communications and Computer Networks	3	1	-	3

Course Objectives:

1. Introducing RFID and related Architectures and to discuss the uses of RFID Principles, RFID Components and security issues.
2. Introducing Wireless Sensor Networks, Various Small Components, embedded systems, introducing various technologies.

Course Outcomes:

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

CO1	Familiar with RFID technology, various components involved.
CO2	Familiar with various RFID standards, Students learn various Security issues involved in it
CO3	Learn about Wireless Sensor Networks
CO4	Familiar with WSN protocols routing algorithms.
CO5	Demonstrate Various Security issues involved in Wireless Sensor Networks.

Syllabus:

Unit-I

Introduction of RFID, Automatic Identification Systems, A Comparison of Different ID Systems, Components of an RFID System, Differentiation Features of RFID Systems, Transponder Construction Formats, Frequency, Range and Coupling , Active and Passive Transponders, Information Processing in the Transponder , Selection Criteria for RFID Systems, Fundamental Operating Principles.

Unit-II

Frequency Ranges and Radio Licensing Regulations, Coding and Modulation, Data Integrity, Multi-Access Procedures – Anticollision, Security of RFID Systems, Attacks on RFID Systems

Unit-III

Wireless Sensor Networks- Introduction, Challenges and Constraints, Applications, Node Architecture, Operating Systems, Physical Layer.

Unit-IV

Medium Access Control: Characteristics of MAC Protocols in Sensor Networks, Contention- Free MAC Protocols, Contention-Based MAC Protocols, Network Layer: Various Routing Protocols.

Unit-V

Security in WSN: Challenges of Security in Wireless Sensor Networks, Security Attacks in Sensor Networks, Protocols and Mechanisms for Security, IEEE 802.15.4 and ZigBee Security

Text Books:

1. RFID Handbook, Klaus Finkenzeller, WILEY & SONS
2. Fundamentals of Wireless Sensor Networks: theory and practice by Waltenegus Dargie, Christian Poellabauer

Reference Books

1. RFID and Sensor Networks Architecture, Protocols, Security and integration by Yan Zhang, Laurence T. Yang, Jining.
2. Wireless Sensor Networks Technology, protocols and applications by KAZEM SOHRABY, DANIEL MINOLI TAIEB ZNATI, JOHN WILEY & SONS, INC Publication.
3. REILLY, RFID Essentials By Bill Glover, Himanshu Bhatt.

WebLinks:

1. <https://nptel.ac.in/courses/108/108/108108179/>
2. <https://nptel.ac.in/courses/106/105/106105160/>

CO-PO Mapping:

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

[illegible]

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)

II B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023)
PAPER – IV: RFID and Sensor Networks
SEMESTER – IV

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.

(3x10=30M)

Part-A

1. Explain about Fundamental Operating Principles of RFID
2. Briefly discuss about Anti-collision procedures in RFID
3. Discuss about Security attacks in RFID

Part-B

4. Write about various challenges and constraints of Wireless Sensor Networks
5. Explain the defence mechanisms against DoS Attacks and Routing Attacks Compare various categories of Network topologies
6. Mention the Characteristics of MAC Protocols in WSN

SECTION – II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. What is the difference between Active and Passive Transponders
8. Explain Criteria for RFID Systems
9. Discuss about Open issues in RFID Security?
10. Write a short on Data Integrity
11. Explain the application areas of WSN
12. What is Physical Layer
13. Write about Zigbee security Explain various types of addressing

Course Code	TITLE OF THE COURSE Network Simulator Lab using NS2/NS3	Program & Semester I B.Sc. M.E.IoT (III Sem)			
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	Data Communications	0	0	3	2

Objectives:

1. To understand the functioning of Wireless Technologies

List of Experiments (NS2/QUALNET/BWSIM/MATLAB)

1. Introduction to network simulators used for wireless Ad Hoc and Sensor Networks.
2. Introduction to TCL scripting: demonstration of one small network simulation script.
3. To study various trace file formats of network simulators.
4. To implement and compare various MAC layer protocols.
5. To implement and compare AODV and DSR routing algorithms in MANET.
6. To implement DSDV routing algorithms in MANET.
7. To implement signal strength based link management routing protocols.
8. To calculate and compare average throughput for various TCP variants.
9. To implement and compare various routing protocols for wireless sensor networks.
10. Using Virtual labs to simulate the Protocols: <http://vlabs.iitkgp.ernet.in/>

Reference books:

1. <https://www.nsnam.org/docs/release/3.9/manual.pdf>

Virtual LabLinks:

1. <http://vlabs.iitkgp.ac.in/ant/5/procedure/>



	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code IoT114	TITLE OF THE COURSE Implementing IoT with Raspberry Pi	II B.Sc. M.E.IoT (IV Sem)			
Teaching	Hours Allocated: 60 (Theory)	L	T	P	C
Pre-requisites:	Foundations of IoT and Arduino	3	1	-	3

Course Objectives:

1. This program aims to train students to be equipped with a solid theoretical foundation, systematic professional knowledge and strong practical skills in the Raspberry Pi.
2. The course focuses on higher-level operating systems, advanced networking, user interfaces, multimedia and uses more computing intensive IoT applications as examples using Raspberry Pi running Linux as the platform of choice
3. After doing this course, students should be able to design and deploy multiple IoT devices that could connect to the gateway.
4. Acquainting students with the basic web app creation
5. Connecting and Using various IoT Cloud Based Platforms such as Blynk, Things peak, AWS IoT, Google Cloud IoT Core etc..
6. Working with Big Data Processing Techniques
7. Developing Mobile App for IoT applications

Course Outcomes:

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

CO1	Appreciate the development technology for IoT
CO2	Familiar with Basic Concepts of Linux
CO3	Design real time IoT Devices.
CO4	Familiar with basic foundations of Python Programming and libraries
CO5	Comprehend the basic concepts of Mobile Cloud Computing
CO6	Develop a Mobile App for IoT applications.

Syllabus:

UNIT-I

Getting Started with Raspberry Pi: Basic functionality of Raspberry Pi B+ board, setting up the board, configuration and use, implications of an operating system on the behavior of the Raspberry Pi as an IoT device, booting Raspberry Pi 3, Downloading an Operating System, format an SD card and booting the OS, Basics of Linux and its use, main features including navigating the file system and managing processes, text based user interface through the shell, overview of the graphic user interface for Raspbian Linux distribution.

UNIT-II

Interfacing Hardware with the Raspberry Pi: Raspberry Pi Remote Access, operate the RaspberryPi in -headless model, Bash Command line, operating Raspberry Pi without needing a GUI interface. Basics of the Python programming language, programming on the Raspberry Pi. Python on Raspberry Pi, Python Programming Environment, Python Expressions, Strings, Functions and Function arguments, Lists, List Methods, Control Flow.

UNIT-III

Communication with devices through the pins of the Raspberry Pi: RPi.GPIO library, Python Functions, setting up the pins, General purpose IO Pins, Protocol Pins, GPIO Access, applying digital voltages, and generating Pulse Width Modulated signals, Tkinter Python library, accessing pins through a graphic user interface

UNIT-IV

IoT Design using Raspberry Pi IoT Applications based on Pi: LAMP Web-server, GPIO Control over Web Browser, Creating Custom Web Page for LAMP, Communicating data using on-board module, Home automation using Pi, Node-RED, MQTT Protocol, Using Node-RED, Visual Editor on Rpi

UNIT-V

IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage models and communication APIs. Webserver – Web server for IoT, Cloud for IoT, Python web application framework. Designing a RESTful web API. Connecting to APIs

Text Books:

1. Simon Monk, —Programming the Raspberry Pi: Getting Started with Python, January 2012, McGraw Hill Professional
2. The official raspberry Pi Projects Book https://www.raspberrypi.org/magpi-issues/Projects_Book_v1.pdf

Reference Books

1. Eben Upton and Gareth Halfacree, —Raspberry Pi User Guide, August 2016, 4th edition, John Wiley & Sons
2. Alex Bradbury and Ben Everard, —Learning Python with Raspberry Pi, Feb 2014,

JohnWiley& Sons

3. Michael Margolis, —Arduino Cookbook, First Edition, March 2011, O'Reilly Media, Inc.

WebLinks:

1. <https://nptel.ac.in/courses/106/105/106105166/>

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)

II B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023)
PAPER – IV: Implementing IoT with Raspberry Pi
SEMESTER – IV

Time: 2 Hrs

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. Explain How to Boot Raspberry Pi 3 ?
2. Write the Features of LINUX OS
3. Explain operating Raspberry Pi without needing a GUI interface

Part-B

4. Explain general purpose IO Pins & Protocol pins
5. Explain cloud storage models
6. Briefly discuss about LAMP Web server

SECTION – II

Answer any four of the following questions .Each question carries 5 marks (4X5=20M)

7. Write the basic functionality of Raspberry Pi B+ board
8. Write a short note Text Based user interface through the shell
9. Explain Raspberry Pi remote access
10. Write some python expressions
11. Explain Strings in Python
12. Discuss Web server for IOT
13. How to Create a web page for LAMP

	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester II B.Sc. M.E.IoT (IV Sem)			
Course Code	TITLE OF THE COURSE Raspberry Pi lab				
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C
Pre-requisites:	Arduino, Basic Electronics	0	0	3	2

Objectives:

1. The main aim of this lab course is to provide hands on experience to the students towards the developing the IoT Devices with the state of art Raspberry pi microprocessor.

List of Experiments

1. Getting started with Raspberry Pi, Install Raspian on your SD card
2. Linux basic commands.
3. Coding simple programs in Python.
4. How to use Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device
5. How to have your Raspberry Pi interact with online services through the use of public APIs and SDKs
6. Understanding the connectivity of Raspberry-Pi with IR sensor. Write an application to detect obstacle and notify user using LEDs.
7. Design APP Using MIT App Inventor and Connect to Temperature Sensor

Virtual Lab Links:

<https://ocw.cs.pub.ro/courses/iot/labs/01>



	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE 6A: Machine Learning for Internet of Things	III B.Sc. M.E.IoT (V Sem)			
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 Learning Concepts 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, ISBN 0-262-01211-1
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: Data Mining, 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 by CRC 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](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-learning>

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 Collecting various weather related data using sensors to develop a Campus weather report prediction model by applying various machine learning algorithms.
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 and acknowledgements.*
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: 2Hours

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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester III 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 or Windows 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 algorithm like 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 GOVERNMENT COLLEGE	
	(Autonomous), KAKINADA	Program & Semester
Course Code	TITLE OF THE COURSE 7A: COMPUTER VISION	III B.Sc. M.E.IoT (V Sem)
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 pattern recognition;
3. To develop an appreciation for various issues in the design of computer vision and object recognition systems; and
4. To provide the student with programming experience from implementing computer vision and object 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 from 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, Stereo Vision, Motion estimation, Structure from motion and models

Unit-4: (10 hours)

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: Prentice Hall.
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 University Press, 2012
8. Mark Nixon and Alberto S. Aquado, Feature Extraction & Image Processing for Computer Vision, 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 librarian including 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 the website and acknowledgements.*
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Arrange expert lectures by IT experts working professionally in the area of Computer vision and other related areas of 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 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

III B.Sc. IOT (M.E.IOT)
MODEL QUESTION PAPER (W.E.F 2022-2023) PAPER- 7A:
COMPUTER VISION

SEMESTER – V

Time: 2Hours

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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester III 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 from 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>



	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester III 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 identifiers and 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 of Things (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 including reading 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, Humidity values 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 and acknowledgements.*
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Arrange expert lectures by IT experts working professionally in the area of App development for 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)

[illegible]

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 Things
SEMESTER – V

Time: 2Hours

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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester III 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 identifiers and 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/DAVirtualLab/>



	PITHAPUR RAJAH'S GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE 7B: Big Data and Analytics	III B.Sc. M.E.IoT (V Sem)			
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 and happier 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 versus 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, comparison 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 MongoDB- Create Database, Drop Database, Datatypes in MongoDB, MongoDB 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 File System), 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 Query Language(HQL), Pig on Hadoop.

Machine Learning Algorithms-Implementation of Regression, Implementation of k- Means.

References

1. Chris Eaton, Dirk derooos et al. "Understanding Big data ", McGraw Hill, 2012.
2. Seema Acharya, Subhashini Chellappan, 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 Ambiga Dhiraj, "Big Data ,Big Analytics: Emerging Business Intelligence and Analytics Trends for Today's 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 including reading 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 and acknowledgements.*
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)

	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-7B: Big Data and Analytics
SEMESTER – V

Time: 2Hours

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 columns 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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester III 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 and happier 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 and generate 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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE 6C: Web of Things	III B.Sc. M.E.IoT (V Sem)			
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 IoT platforms and application domains.**
2. Overall, the goal of the WoT is to preserve and complement existing IoT standards and solutions.

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 EVERYTHING, 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, WebSockets , 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 WebSockets

Gateway integration pattern- CoAP example, Running a CoAP server , Proxying CoAP via a gateway

Cloud integration pattern-MQTT over EVERYTHING - Set up your EVERYTHING 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 with Manning.
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 of things. <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 librarian including 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: 2Hours

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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester III 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 IoT platforms and application domains.**
2. Overall, the goal of the WoT is to preserve and complement existing IoT standards and solutions

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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester			
Course Code	TITLE OF THE COURSE 7C: Security in IoT	III B.Sc. M.E.IoT (V Sem)			
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 service 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 (IoT): Models, Algorithms, and Implementations.
4. Michael T. Goodrich and Roberto Tamassia, "Introduction to Computer Security", Addison Wesley, 2011.
5. Brian Russell, Drew Van Duren, "Practical Internet of Things Security". Packt Publication.

2016

6. Web resources:

<https://online.stanford.edu/courses/xe100-introduction-internet-things>

7. Other web sources suggested by the teacher concerned and the college librarian including 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 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 the website 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 the syllabus. 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)

[illegible]

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-
IoT 122- 7C: Security in IoT

SEMESTER – V

Time: 2Hours

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 GOVERNMENT COLLEGE (Autonomous), KAKINADA	Program & Semester III 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

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, Cloud 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

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

TENTATIVE ACTION PLAN 2023 - 24

Name of the Department: Computer Science

Name of the HOD: Dr B V Tirupanyam

S.No	Month & Year	Activity Planned	Tentative Date	Remarks, If Any
1	Sep- 2023	Training to staff on Office Automation Tools	3 rd week of September	Online/ Offline
2	Oct - 2023	Commencement of certificate course	2 nd week of October	
		PG Entrance Coaching for UG Students	3 rd week of October	
3	Nov - 2023	Conduction of one outreach program	2 nd week of November	
4	Dec - 2023	World Computer Literacy Day	2 dec 2023	
		National Conference	2 nd week of December	
5	Feb - 2024	World Computer Day	15 th Feb	
		National science day celebrations	4 th week of February	
6	Mar - 2024	Industrial Visit	1 st week of March	
It is proposed to make five MoUs with reputed organizations				
Proposed to provide consultancy services of worth 1 lakh				

Head of the Department

Dept. Of Computer Science