P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- III(W.E.F. 2021-2022)
Course: Data Communications & Computer Networks

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week **Credits: 03**

Objectives:

Emphasize the wired & wireless computer networks as a hybrid system to reflect the currenttrends of modern communications network architectures and techniques, instead of treating thewired networks and wireless networks separately, focus on both network architecture design andrigorous mathematical modelling techniques for performance analyses, rather than mainly on thenetwork protocols specifications, integrate results of instructor's research and emergingtechniques into the course topics to motivate students' research interests, not confined totraditional techniques.

Course Outcomes:

Students get familiar with various Network Reference Models, Protocols and issues involved inWired and wireless networks.

MODULE - 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.

MODULE – 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.

MODULE – 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).

MODULE - 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's, Transition from Ipv4 to Ipv6.

MODULE - 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
2. Alberto Leon-Garcia, Communication Networks, 2012, Ninth Reprint, Tata McGraw-Hill, India.

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.
5. Robert Gallager, Data Networks, 2010, 2nd edition, Prentice Hall, India.
6. W. Stallings, Data and Computer Communications, 2004, Prentice Hall, India.

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. Problem-solving exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports like "Establishing a hybrid network protocol as per your college needs".
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)
II B.Sc (MEIOT)

SEMESTER-III

Course: Data Communications & Computer Networks
Time: 2.30Hrs **Marks: 60**

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	2	30
Module-2	2	2	30
Module-3	2	1	25
Module-4	1	1	15
Module-5	1	1	15
Total No. of questions	8	7	
Total Marks Including choice			115

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)
IIB.Sc (MEIOT)
SEMESTER-III

Course: Data Communications & Computer Networks **Time: 2.30Hrs**
Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	**7**	**5**	**35**	**4**	**5**	**20**
2	Section-B Essay Questions	**8**	**10**	**80**	**4**	**10**	**40**
TOTAL				**115**	**TOTAL MARKS**		**60**

Percentage of choice given = $\frac{115 - 60}{115} \times 100 = \frac{55}{115} \times 100 = 47.82\%$

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- III(W.E.F. 2021-2022)
Course: Data Communications & Computer Networks

Time: 2:30hrs **SEMISTER – III** **Max. Marks: 60**

Section – A

Answer any 4 Questions (Short answer questions) **(4x5=20M)**

1. Explain various types of networks?
2. What are the TCP/IP utilities?
3. What is the need for FRAMING?
4. Explain the difference between FDMA and CDMA?
5. Explain about transition from IPv4 to IPv6
6. Explain IEEE standards?
7. Explain the types of Routing protocols?

Section – B

Answer All Questions **(4x10=40M)**

8. A) Explain the functions of various layers of OSI model?

   (or)

   B) Explain various Network topology

9. A) Explain GO-Back-N-ARQ

   (or)

   B) Explain the transmission of Digital Signals

10. A) What is Random access? Explain about CSMA/CD protocols?

    (or)

    B) Explain about wireless LAN (802.11)

11. A) Explain Back bone networks

    (or)

    B) Explain Domine Name Space and Distribution name space

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- III(W.E.F. 2021-2022)
Course: Wire and Wireless networks Lab

Practical /Laboratory-III

Time: 2 Hrs Marks: 50

Practical/Laboratory – III

1. Internal Practicals 20 Marks
2. External Practicals 30 Marks

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- III (W.E.F. 2021-2022)

Course: Wire and Wireless networks Lab

Practical /Laboratory-III

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

1. Study of Network Devices in detail
2. Study of Network IP and basic network command and network configuration commands
3. Wired and Wireless network scenario creation.
4. Simulation of Four Node Point To Point Network
5. Transmission Of Ping Message
6. Implement various Topologies
7. Study of Routing Protocols.
8. Study of performance of MAC Protocols
9. UDP and TCP Simulation
10. Call establishment in cellular network.
11. Handover in cellular network.
12. Study of Performance Comparison of TCP and UDP using NS – 2

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- IV (W.E.F. 2021-2022)
Course: RFID and Wireless Sensor Networks

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week **Credits: 03**

Course Objectives:

1. Understand and designing Radio frequency identification (RFID) systems, middleware architectures for real-world applications.
2. Understanding RFID and related Architectures, RFID Principles and security issues
3. Determine road map for transformation of flexible electronics from foils to textiles
4. Understanding the implementation, challenges and design constraints of WSN
5. Knowing about the MAC layer and routing protocols in WSN
6. Modeling of WSN for interfacing with IoT platform.
7. Knowing Security threats and resolution methods in WSN.

Course Outcomes

1. Students will be familiar with RFID technology, various components involved.
2. Getting familiar with various RFID standards, Students learn various Security issues involved in RFID.
3. Students learn about Wireless Sensor Networks
4. Familiar with WSN protocols routing algorithms.
5. Various Security issues involved in Wireless Sensor Networks.

MODULE-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.

MODULE-II

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

MODULE-III

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

MODULE-IV

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

MODULE-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. Ian F. Akyildiz, and Mehmet Can Vuran, Wireless Sensor Networks, 2010, Wiley, USA.
3. IBM Bluemix: The Cloud Platform for Creating and Delivering Applications, http://www.redbooks.ibm.com/redpapers/pdfs/redp5242.pdf
4. Wireless Sensor Networks Technology, protocols and applications by KAZEM SOHRABY, DANIEL MINOLI TAIEB ZNATI, JOHN WILEY & SONS, INC Publication.
5. REILLY, RFID Essentials By Bill Glover, Himanshu Bhatt.
6. W. Dargie and C. Poellabauer, Fundamentals of Wireless Sensor Networks, 2010, Wiley, USA.
7. Holger Karl and Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, 2011, Wiley, USA.

RECOMMENDED CO-CURRICULAR ACTIVITIES:

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A. Measurable

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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. Problem-solving exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports like "Design of RFID Smart Attendance cum Doorlock System for College Laboratory".
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,

Peers and self-assessment, outputs form individual and collaborative work

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)
II B.Sc (MEIOT) COURSE CODE:
SEMESTER-IV
Course:RFID and Sensor Networks Time: 2.30Hrs Marks: 60

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	2	30
Module-2	2	2	30
Module-3	2	1	25
Module-4	1	1	15
Module-5	1	1	15
Total No. of questions	8	7	
Total Marks Including choice			115

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2020-2021)
IIB.Sc (MEIOT) COURSE CODE:
SEMESTER-IV

Course: RFID and Sensor Networks
Time: 2.30 Hrs
Marks: 60

Model blue print for the model paper and choice

S.NO	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section-A Short Questions	**7**	**5**	**35**	**4**	**5**	**20**
2	Section-B Essay Questions	**8**	**10**	**80**	**4**	**10**	**40**
TOTAL				**115**	**TOTAL MARKS**		**60**

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P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)
Course: RFID and Wireless Sensor Networks

Time: 2:30hrs **SEMISTER – IV** **Max. Marks: 60**

Section – I

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

8. Write about RFID.
9. What are the difference between active and passive Transponders
10. Explain coding and modulation in RFID
11. What is Data integrity
12. Explain challenges and constraints in WSN?
13. Discuss the Security in Wireless Sensor Networks?
14. Write the contention based MAC protocols

Section – II

Answer All Questions **(4x10=40M)**

15. a) Explain fundamental operating principles of RFID
    (or)
    b) Explain features of RFID systems
16. a) Explain multi-access procedures in anti-collision?
    (or)
    b) Explain Node architecture?
17. a) Discuss the various Routing protocols in WSN
    (or)
    b) Explain characteristics of MAC protocols in WSN
18. a) Explain IEEE 802.15.4
    (or)
    b) Discuss the security attacks in sensor Networks

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)
Course: Network Simulator –3 Lab

Practical /Laboratory-IV

Time: 2 Hrs Marks: 50

Practical/Laboratory – IV

3. Internal Practicals 20 Marks
4. External Practicals 30 Marks

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)

Course: Network Simulator –3 Lab
Practical /Laboratory-IV

List of Experiments

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

P R GOVT COLLEGE (A), KAKINADA
III B.Sc –MEIOT / Semester- IV (W.E.F. 2021-2022)
Course: Implementing IOT with Raspberry Pi

Total Hrs. of Teaching-Learning: 52 @ 4 Hrs / Week **Credits: 03**
Course Objectives:

The course is aimed at

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, Thingspeak, AWS IOT, Google Cloud IOT Core etc..
6. Working with Big Data Processing Techniques
7. Developing Mobile App for IOT application

Course Outcomes:

At the end of the course the student should be able to

1. Appreciate the development technology for IOT
2. Familiar with Basic Concepts of Linux
3. Design real time IOT Devices.
4. Familiar with basic foundations of Python Programming and libraries
5. Comprehend the basic concepts of Mobile Cloud Computing
6. Develop a Mobile App for IOT applications.

MODULE-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 Raspian Linux distribution.

MODULE-II

Interfacing Hardware with the Raspberry Pi, Raspberry Pi Remote Access, operate the Raspberry Pi in “headless mode”, 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.

MODULE-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

MODULE-IV

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

MODULE-V

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

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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

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5. Observation of practical skills,
6. Individual and group project reports like "Develop a Real time application like a smart home with following requirements: If anyone comes at door the camera module automatically captures his image send it to the email account of user or send notification to the user. Door will open only after user„s approval.".
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

P. R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA
MODEL BLUE PRINT(W.E.F. 2021-2022)
II B.Sc (MEIOT) COURSE CODE:
SEMESTER-IV

Course:Implementing IOT with Raspberry Pi

Time: 2.30Hrs
Marks: 60

Model Blue print for the question paper setter

Chapter Name	Essay Questions 10 Marks	Short Questions 5 Marks	Marks allotted to the chapter
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P R GOVT COLLEGE (A), KAKINADA
I B.Sc –MEIOT / Semester- II(W.E.F. 2021-2022)
Course: Implementing IOT with Raspberry Pi

Time: 2:30hrs **SEMISTER – IV** **Max. Marks: 60**

Section – I

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

1. Write the basic functionality of Raspberry Pi B+ Board
2. Write a short note about Text based user interface through the shell
3. Explain Raspberry Pi remote access
4. Write some python expressions
5. Explain strings in Python
6. Discuss web server for IOT
7. How to create a web page for LAMP

Section – II

Answer All Questions **(4x10=40M)**

8. A) how to Boot Raspberry Pi 3 & Explain?
   (Or)
   B) Write the features of LINUX OS

9. A) Explain operating Raspberry Pi without needing a GUI interface
   (Or)
   B) Explain function arguments in Python

10. A) Explain general purpose IO Pins & protocol pins
    (Or)
    B) Explain about accessing pins through a GUI
11. A) Explain cloud storage models
    (Or)
    B) Briefly discuss about LAMP web server.

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- IV(W.E.F. 2021-2022)

Course: Raspberry Pi Lab

Practical /Laboratory-IV

Time: 2 Hrs Marks: 50

Practical/Laboratory – IV

1. Internal Practicals 20 Marks
2. External Practicals 30 Marks

P R GOVT COLLEGE (A), KAKINADA
II B.Sc –MEIOT / Semester- IV (W.E.F. 2021-2022)
Course: Raspberry Pi Lab

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