



GOVERNMENT OF TAMILNADU

DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI-25

STATE PROJECT COORDINATION UNIT

(Established under Canada India Institutional Cooperation Project)

CURRICULUM

| Course Name | WIRELESS SENSOR NETWORK INSTALLATION |
|------------------------------|--|
| Course Code | EC/2020/020 |
| Course Duration | 40 Hours |
| Minimum Eligibility Criteria | 10 th /+2 /ITI/Diploma/Graduate |
| Pre-requisites (if any) | Knowledge of Basic Electronics |
| | |
| Course Objectives | Training module has been designed for the participants to <ul style="list-style-type: none"> Understand the wireless network concept and topologies Learn the Interfacing techniques of wireless sensors Practice on Applying Bluetooth and Zigbee technologies in wireless sensor network. |
| | |
| Course Outcomes | At the end of training, the trainees will be able to <ul style="list-style-type: none"> Explain the concept and topologies of wireless network Interface Bluetooth sensor with controller through network Interface Zigbee sensors with network and controller |
| | |
| Expected Job Roles | Wireless Network Technician |

TEACHING AND SCHEME OF EXAMINATION

| Course Code | Course Name | Hours | | Assessment Marks | | Duration of Examination |
|-------------|--------------------------------------|-----------|----|------------------|-----|-------------------------|
| | | | | Min | Max | |
| EC/2020/020 | WIRELESS SENSOR NETWORK INSTALLATION | Theory | 16 | 10 | 20 | 3 Hours |
| | | Practical | 24 | 40 | 80 | |
| | | Total | 40 | 50 | 100 | |

EC/2020/020 – WIRELESS SENSOR NETWORK INSTALLATION

DETAILED SYLLABUS

| Unit No | Modules | No.of.Hours | |
|--------------------------------|---|-------------|-----------|
| | | Theory | Practical |
| I | Introduction | 08 Hours | |
| 1.1 | Introduction to wireless sensor network | 03 | 05 |
| 1.2 | WSN architecture | | |
| 1.3 | Sensing unit, Processing unit, Transceiver unit, Power unit | | |
| 1.4 | Application of wireless sensor network | | |
| 1.5 | Challenges in sensor network | | |
| II | Network Topologies | 07 Hours | |
| 2.1 | Wireless sensor network topologies: Star topologies, Tree Topologies, Mesh Topologies. | 03 | 04 |
| 2.2 | Types of wireless sensor network, Terrestrial wireless sensor networks | | |
| 2.3 | Underwater wireless sensor networks, Underground wireless sensor networks | | |
| 2.4 | Multimedia wireless sensor networks | | |
| 2.5 | Mobile wireless sensor networks | | |
| III | Applications of wireless sensor networks | 25 Hours | |
| 3.1 | Turn ON and OFF a 230V AC Lamp using Bluetooth module, DC Light control using Blue tooth technology | 10 | 15 |
| 3.2 | Bluetooth based DC Motor ON/OFF control system, Radio frequency based Tube light turn ON and OFF control | | |
| 3.3 | Remote based DC Motor control system using Radio Frequency technology, Turn ON and OFF the buzzer unit based Radio Frequency Technology. | | |
| 3.4 | Temperature control system using Zigbee wireless networking | | |
| 3.5 | Zigbee wireless network based Fire monitoring system, Zigbee based mine safety monitoring system with Gas sensor, Infrared sensor based Zigbee Technology | | |
| Total Theory / Practical Hours | | 16 | 24 |
| Total hours | | 40 | |

HARDWARE REQUIREMENT

| S.NO | LIST OF TOOLS /EQUIPMENTS |
|------|---------------------------|
| 1 | Sensors |
| 2 | Filters |
| 3 | Transmission unit |
| 4 | Power supply |
| 5 | Computer system |
| 6 | Microcontroller |

SOFTWARE REQUIREMENT

| NAME OF THE SOFTWARE |
|----------------------|
| NIL |

REFERENCE BOOKS

| S.NO | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|------|---|--|------------------------|
| 1 | Wireless Sensor Networks: Technology, Protocol and Applications | KazemSohraby, Daniel Minoli, TaiebZnati | Wiley |
| 2 | Fundamentals of Wireless sensor Networks: Theory and Practice | WaltenegusDargie, Christian Poellabauer | Wiley |
| 3 | Wireless Sensor Networks: Technology and Applications | Mohammad Matin (ed.) | InTech , 2012 |
| 4 | Wireless Sensor Network Designs | Anna Hac | John Wiley & Sons, |
| 5 | Wireless Sensor Networks: Architectures and Protocols | Edgar H. Callaway, Jr. and Edgar H. Callaway | CRC Press, August 2003 |
| 6 | IEEE 802.15.4 Low-Rate Wireless Personal Area Networks: Enabling Wireless Sensor Networks | Jose A. Gutierrez, Edgar H. Callaway, Raymond Barrett, | IEEE, April 2003. |
| 7 | Energy Scavenging for Wireless Sensor Networks: With Special Focus on Vibrations | Shad Roundy, Paul Kenneth Wright, and Jan M. Rabaey, | Kluwer, January 2004 |

ASSESSMENT AND CERTIFICATION

| S.No | Criteria for assessment |
|------|--|
| 1. | A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the CIICP Project Polytechnic College for a duration of 3 hours |
| 2. | A trainee must have 75% of attendance to appear for End examination in Theory and Practical. |
| 3. | The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions) |
| 4. | The assessment for practical part will be based on the marks scored in the end examination conducted by the CIICP Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic. |
| 5. | The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination. |
| 6. | On successful completion of training, certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics. |

END EXAMINATION

ALLOCATION OF MARKS

| S.NO | Description | Max. Marks |
|--------------------|---|------------|
| 1. | Theory Examination | 20 |
| 2. | Practical Examination | |
| | a)Objective and Circuit Diagram | 20 |
| | b)Procedure and Connections / Execution | 20 |
| | c)Result and Viva | 20 |
| | d)Record | 20 |
| Total Marks | | 100 |

THEORY MODEL QUESTION PAPER

EC/2020/020–WIRELESS SENSOR NETWORK INSTALLATION

(Maximum Marks: 20)

(N.B: Answer any Twenty questions)

20x1= 20 Marks

1. Write any two characteristic of Wireless Sensor Network.
2. Write any two advantages of Wireless Sensor Network.
3. Write any two disadvantages of Wireless Sensor Network.
4. List out the types of layers in Wireless Sensor Network.
5. What are the four basic components of a Sensor Node in a WSN?
6. What is the function of Network layer?
7. What is the function of Transport layer?
8. What is the Data Link layer?
9. What is the function of Application layer?
10. What is the function of Physical layer?
11. Write any types of sensors used in WSN.
12. Write any two applications of Wireless Sensor Network.
13. What are the different types of WSNs?
14. Write any two advantages of Mobile wireless sensor networks.
15. List out the different types of Wireless sensor network topologies.
16. What is Star topology?
17. What is Mesh topology?
18. What is Tree topology?
19. What is Blue tooth technology?
20. List any two features of Blue tooth technology.
21. List any two applications of Blue tooth technology.
22. What is ZigBee wireless technology?
23. What are the three classes of ZigBee devices?
24. List any two features of ZigBee wireless technology.
25. List any two applications of ZigBee wireless technology.