

|   |  |            |                                   |                       |                          |          |          |
|---|--|------------|-----------------------------------|-----------------------|--------------------------|----------|----------|
| <b>COURSE CODE</b>  |  |            | <b>YCS302</b>                     | <b>L</b>              | <b>T</b>                 | <b>P</b> | <b>C</b> |
| <b>COURSE NAME</b>  |  |            | <b>YCS302 - WIRELESS NETWORKS</b> | <b>3</b>              | <b>1</b>                 | <b>1</b> | <b>5</b> |
| <b>C</b>  | <b>P</b>   | <b>A</b>   |                                   | <b>L</b>              | <b>T</b>                 | <b>P</b> | <b>H</b> |
| <b>3</b>  | <b>0.5</b>   | <b>0.5</b> |                                   | <b>3</b>              | <b>1</b>                 | <b>2</b> | <b>6</b> |
| <b>PREREQUISITE</b>   |  |            | Computer Networks                 |                       |                          |          |          |
| <b>COURSE OUTCOMES:</b>   |  |            |                                   |                       |                          |          |          |
| <b>Course outcomes:</b>   |  |            |                                   | <b>Domain</b>         | <b>Level</b>             |          |          |
| <b>CO1</b>  | Define the basic WSN technology and supporting protocols, with emphasis place on standardization basic sensor systems and provide a survey of sensor technology. |            |                                   | Cognitive Psychomotor | Remember Perception      |          |          |
| <b>CO2</b>  | Illustrate medium access control protocols and address physical layer issues.  |            |                                   | Cognitive Psychomotor | Understand Perception    |          |          |
| <b>CO3</b>  | Examine key routing protocols for sensor networks and main design issues.  |            |                                   | Cognitive Psychomotor | Apply Perception Receive |          |          |
| <b>CO4</b>  | Analyse transport layer protocols for sensor networks, and design requirements.  |            |                                   | Cognitive Psychomotor | Analyse                  |          |          |
| <b>CO5</b>  | Represent the Sensor management, sensor network middleware, operating systems.   |            |                                   | Cognitive Psychomotor | Understand Perception    |          |          |
| <b>Unit I Wireless Networks</b>   |  |            |                                   |                       | <b>12 Hours</b>          |          |          |
| Introduction Evolution of wireless networks – Challenges - Transmission fundamentals: Analog and digital data transmission - Transmission media - Modulation techniques for wireless systems - Multiple access for wireless systems - Performance increasing techniques for wireless networks   |  |            |                                   |                       |                          |          |          |
| <b>Unit II Wireless LAN</b>   |  |            |                                   |                       | <b>12 Hours</b>          |          |          |
| Introduction to Wireless LANs – WLAN Equipment, Topologies, Technologies, IEEE 802.11 WLAN – Architecture and Services - Physical Layer - MAC Sub Layer –MAC Management Sub Layer, Other IEEE 802.11 Standards.   |  |            |                                   |                       |                          |          |          |
| <b>Unit III Wireless Personal Area Networks</b>   |  |            |                                   |                       | <b>12 Hours</b>          |          |          |
| Introduction – Bluetooth: Architecture - Protocol Stack - Physical Connection – Mac mechanism – Frame format – Connection management –Low Rate and High Rate WPAN, Zig Bee Technology IEEE 802.15.4: Components – Network topologies – PHY – MAC  |  |            |                                   |                       |                          |          |          |
| <b>Unit IV Ad-hoc Wireless Networks</b>   |  |            |                                   |                       | <b>12 Hours</b>          |          |          |
| Introduction- Characteristics of Adhoc Networks - Classifications of MAC Protocols: Connection Based protocols, Reservation Mechanism - Table driven Routing protocols: DSDV, WRP - On Demand routing protocols: DSR, AODV,TORA –Routing Protocol with Efficient Flooding Mechanism: OLSR - Hierarchical routing protocols – CBRP, FSR. |  |            |                                   |                       |                          |          |          |
| <b>Unit V Wireless Sensor Networks</b>  |  |            |                                   |                       | <b>12 Hours</b>          |          |          |
| Introduction - Challenges for wireless sensor networks - Comparison of sensor network with ad-hoc network - Single node architecture: Hardware components - Energy consumption of sensor nodes - Network architecture: Sensor network scenarios - Design principles – Operating systems..   |  |            |                                   |                       |                          |          |          |

**Lab Exercise:**

1. 802.11 Association and Channels
2. Wireless fidelity
3. Multi-hop routing-TCP Performance
4. Dynamic Ad-hoc Routing
5. RFID Basics
6. Data throughput
7. Rate Control
8. Back pressure Scheduling
9. MAC Contention Window and RTS

802.11 fairness and comparison

| HOURS | LECTURE | TUTORIAL | TOTAL |
|-------|---------|----------|-------|
|       | 45      | 15       | 60    |

**TEXT BOOKS**

1. Nicopolitidis P, “Wireless Networks”, John Wiley and Sons, New York, 2010.
2. Vijay K Garg, Wireless Communication and Networking, Morgan Kaufmann Publishers 2010.
3. Siva Ram Murthy C., Manoj B S, “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall, 2012.

**REFERENCES**

1. Holger Karl and Andreas Willig, “Protocol and Architecture for Wireless Sensor Networks”, John Wiley Publication, 2011.
2. Kaveh Pahlavan, “Principles of wireless networks”, Prentice-Hall of India, 2013.

**E-REFERENCES**

1. <https://www.te.com/usa-en/industries/sensor-solutions/insights/sensors-sleep-apnea-whitepaper.html>
2. <https://www.bluetooth.com/blog/smart-building-use-cases/> [https://wballiance.com/wp-content/uploads/2019/03/Case-Study\\_VAST-Networks-Mobile-DataOffload.pdf](https://wballiance.com/wp-content/uploads/2019/03/Case-Study_VAST-Networks-Mobile-DataOffload.pdf)
3. <https://www.postscapes.com/agtech/#case-studies>

**Mapping of Course Outcomes (CO) with Programme Outcomes (PO):**

| M.Sc CS | PO |   |   |   |   |   |   | PSO |   |
|---------|----|---|---|---|---|---|---|-----|---|
|         | 1  | 2 | 3 | 4 | 5 | 6 | 7 | 1   | 2 |
| CO1     | 2  | 1 | 1 | 1 | 1 | 1 | 3 | 1   | 0 |
| CO2     | 2  | 1 | 1 | 1 | 1 | 1 | 1 | 1   | 0 |
| CO3     | 2  | 2 | 1 | 1 | 2 | 2 | 2 | 1   | 0 |
| CO4     | 2  | 1 | 1 | 1 | 0 | 1 | 1 | 1   | 0 |
| CO5     | 1  | 1 | 1 | 1 | 1 | 1 | 2 | 1   | 0 |
| Average | 2  | 1 | 1 | 1 | 1 | 1 | 3 | 1   | 2 |

3–High Relation, 2–Medium Relation, 1–Low Relation, 0–No Relation