# WIRELESS SENSOR NETWORKS AND IOT

| Course Code | 19EC4501F | Year | III | Semester | I |
|---|---|---|---|---|---|
| Course Category | Elective -I | Branch | ECE | Course Type | Theory |
| Credits | 3 | L-T-P | 3-0-0 | Prerequisites | Nil |
| Continuous Internal Evaluation: | 30 | Semester End Evaluation: | 70 | Total Marks: | 100 |

| Course Outcomes | |
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| Upon successful completion of the course, the student will be able to | |
| CO1 | Analyse various WSN of Architectures, Protocols, and IOT Network Architecture and Design, (L4). |
| CO2 | Analyse various WSN of Architectures, Protocols. (L4). |
| CO3 | Design and Analyse IOT Network Architectures (L5). |
| CO4 | Evaluate and Designing protocols for Wireless Networks and IOT Network Architectures (L5). |
| CO5 | Design protocols for Ad Hoc Wireless Networks (L5). |

**Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)**
Note: 1- Weak correlation   2-Medium correlation   3-Strong correlation
\* - Average value indicates course correlation strength with mapped PO

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | | 3 | | 2 | | | 2 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 2 | 2 | | 3 | | 2 | | | 2 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 2 | | 3 | | 2 | | | 2 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 2 | | 3 | | 2 | | | 2 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 2 | 2 | | 3 | | 2 | | | 2 | 2 | 2 | 3 |
| Average\* (Rounded to nearest integer) | 3 | 3 | 2 | 2 | | 3 | | 2 | | | 2 | 2 | 2 | 3 |

| Syllabus | | |
|---|---|---|
| Unit No. | Contents | Mapped CO |
| I | **Introduction:** Key definitions of sensor networks, Advantages of sensor Networks, Unique constraints an challenges, Driving Applications, Enabling Technologies for Wireless Sensor Networks. | CO1 ,CO4 |
| II | **Architectures:** Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Optimisation Goals and Figures of Merit, Physical Layer and Transceiver Design Considerations, Personal area networks (PANs), hidden node and exposed node problem, Topologies of PANs, MANETs, WANETs | CO1,CO2 ,CO4 |
| III | **Protocols:** Issues in Designing MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks and Classifications of MAC Protocols. Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols | CO1,CO2, CO4,CO5 |

| IV | Genesis of IoT, IoT and Digitization, Connected Roadways, Connected Factory, Smart Connected Buildings, Smart creatures, Convergence of IT and OT, IoT Challenges | CO1,CO3, CO4 |
|---|---|---|
| V | IoT Network Architecture and Design, IoT Architectural Drivers, The oneM2M IoT Standardized Architecture, The IoT World Forum (IoTWF) Standardized Architecture, Things: Sensors and Actuators Layer, Communications Network Layer, Applications and Analytics Layer, IoT Data Management and Compute Stack, Edge, Fog, and Cloud computing | CO1,CO3, CO4 |

| Learning Resources |
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| **Text Books** |
| 1. Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005. |
| 2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007. |
| 3. IoT Fundamentals Networking Technologies, Protocols, and Use Cases for the Internet of Things by David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Jerome Henry, Robert Barton by Cisco Press, 2017 |
| **Reference Books** |
| 1. Raghavendra, Cauligi S, Sivalingam, Krishna M., Zanti Taieb, Wireless Sensor Network, Springer 1/e, 2004 (ISBN: 978, 4020, 7883, 5). |
| 2. Ian F. Akyildiz and Mehmet Can Vuran, Wireless Sensor Networks, John Wiley and Sond Ltd, Publication, 2010 |
| **e- Resources & other digital material** |
| 1.https://www.ipwea.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=e0619c58-f639-080a-86c2-055ae9c8af4d<br>2.http://www.infocobuild.com/education/audio-video-courses/computer-science/IntroductionToIoT-IIT-Kharagpur/lecture-18.html |