WIRELESS SENSOR NETWORKS
(Professional Elective –III)

Course Code	20IT4701A	Year	IV	Semester	I
Course Category	PE3	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Networks
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		Blooms Taxonomy Level
Upon Successful completion of course, the student will be able to		
CO1	Design a wireless sensor network for given sensor data using microcontroller, transceiver, middleware and operating system.	L2
CO2	Evaluate the performance of schedule based and random Medium Access Control protocols for power consumption, fairness, channel utilization and control packet overhead.	L3
CO3	Evaluate the performance of Geographic routing protocols for power consumption, scalability and latency parameters.	L3
CO4	Evaluate the performance of transport control protocols for congestion detection and avoidance, reliability and control packet overhead parameters.	L3

Correlation between CO – PO, CO- PSO (Use √ symbol for representing correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	√													
CO2		√												
CO3				√										
CO4				√									√	√

Strength of Correlation between CO – PO, CO- PSO in scale of 1-3

1: Slight (low),   2: Moderate (medium)   3: Substantial (High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		3												
CO3				3										
CO4				3									3	3
Overall course	3	3		3									3	3

Syllabus		
Unit No	**Contents**	**Mapped CO**
I	Introduction Wireless Networks, Protocol Suites and Standards, OSI Model and TCP/IP Protocol Suite, Adhoc Networks, Comparison of Adhoc and Sensor Networks, Applications of Sensor Networks, Challenges and Hurdles in Sensor network design	**CO1**

II	Wireless Transmission Technology and Systems Bluetooth; IEEE 802.11a/b/g/n series of wireless LANs; ZigBee; Radio-frequency identification (RFID) Traditional Transport Control Protocols-TCP, UDP; Feasibility of Using TCP or UDP for WSNs, Transport Protocol Design Issues, Existing Transport Control Protocols- CODA (Congestion Detection and Avoidance), ESRT (Event-to-Sink Reliable Transport) Performance of Transport Control Protocols.	**CO1, CO2**
III	Sensor-node Architecture Hardware components, Energy consumption of sensor nodes, Operating systems and execution environments, Physical layer and transceiver design considerations in Wireless Sensor Networks.	**CO1, CO2**
IV	Medium Access Control Protocols for Wireless Sensor Networks Fundamentals of MAC Protocols, Performance Requirements, Types of MAC protocols - Schedule-Based and Random Access-Based Protocols, Sensor-MAC, Zebra-MAC	**CO1, CO3**
V	Routing Protocols for Wireless Sensor Networks Fundamentals of Routing Protocols, Performance Requirements, Routing Strategies in Wireless Sensor Networks - Flooding and its variants, LEACH, Power-Efficient Gathering in Sensor Information Systems, Directed diffusion, Geographical routing.	**CO1, CO4**

Learning Resources

Text Books

1. Holger Karl, Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, John Wiley.
2. Kazem Sohraby, Daniel Minoli, Taieb Znati, Wireless Sensor Networks: Technology, Protocols, and Applications, John Wiley.
3. Ananthram Swami, Qing Zhao, Yao-Win Hong, Lang Tong, Wireless Sensor Networks, Signal Processing and Communications Perspectives, John Wiley.
4. C. S. Raghavendra, Krishna M. Sivalingam, Taieb Znati, Wireless Sensor Networks, Kluwer Academic.
5. Bhaskar Krishnamachari, Networking Wireless Sensors, Cambridge University Press.

References

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