

## WIRELESS SENSOR NETWORKS

<b>Course Code</b>	20EC4703B	<b>Year</b>	IV	<b>Semester</b>	I
<b>Course Category</b>	Professional Elective-V	<b>Branch</b>	ECE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Data Communication Networks
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

### Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	<b>Describe</b> the overview of wireless sensor networks and enabling technologies for wireless sensor networks (L2)
<b>CO2</b>	<b>Apply</b> the design principles of WSN architectures and operating systems for simulating environment situations. (L3)
<b>CO3</b>	<b>Apply</b> various concepts for assignment of MAC addresses. (L3)
<b>CO4</b>	<b>Select</b> the appropriate infrastructure, topology, joint routing and information aggregation for wireless sensor networks (L3)
<b>CO5</b>	<b>Analyse</b> the sensor network platform and tools state-centric programming. (L4)

### 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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
<b>CO1</b>	2	-	-	-	-	2	-	-	-	2	-	2	-	-
<b>CO2</b>	3	-	3	-	-	3	3	-	-	3	-	-	-	3
<b>CO3</b>	2	-	-	-	2	-	-	-	-	2	-	-	-	-
<b>CO4</b>	2	-	-	-	-	-	-	-	-	2	-	-	2	-
<b>CO5</b>	-	2	-	-	2	-	-	2	-	2	-	-	2	-
Average * (Rounded to nearest integer)	2	2	3		2	3	3	2		2		2	2	3

### Syllabus

Unit No.	Contents	Mapped CO
I	<b>OVERVIEW OF WIRELESS SENSOR NETWORKS:</b> Single-Node Architecture - Hardware Components- Network Characteristics- unique constraints and challenges, Enabling Technologies for Wireless Sensor Networks- Types of wireless sensor networks.	CO1,CO2
II	<b>ARCHITECTURES:</b> Network Architecture- Sensor Networks- Scenarios- Design Principle, Physical Layer and Transceiver Design	CO1,CO2

	Considerations, Optimization Goals and Figures of Merit, Gateway Concepts, Operating Systems and Execution Environments- Introduction to TinyOS and nesC- Internet to WSN Communication	
III	<b>NETWORKING SENSORS:</b> MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - SMAC, - B-MAC Protocol, IEEE 802.15.4 standard and ZigBee, the Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols Energy-Efficient Routing, Geographic Routing.	CO1,CO3
IV	<b>INFRASTRUCTURE ESTABLISHMENT:</b> Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control	CO1,CO4
V	<b>SENSOR NETWORK PLATFORMS AND TOOLS:</b> Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node level Simulators, State-centric programming.	CO1,CO5

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<b>Learning Resources</b>	
<b>Text Books</b>	
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. Walteneus Dargie , Christian Poellabauer, "Fundamentals Of Wireless Sensor Networks - Theory And Practice", John Wiley & Sons Publications, 2011	
<b>Reference Books</b>	
1. KazemSohraby, Daniel Minoli, & TaiebZnati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007.	
2. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003	
<b>e- Resources &amp; other digital material</b>	
1. <a href="http://pages.di.unipi.it/bonuccelli/sensori.pdf">http://pages.di.unipi.it/bonuccelli/sensori.pdf</a>	

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