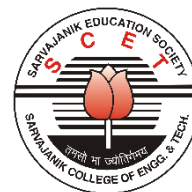




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**Sarvajanik College of Engineering and Technology**  
**Bachelor of Technology**



**B. Tech. Semester VII**

**Subject Name:** Wireless Sensor Network

**Subject Code:** BTEC15704

**Type of course:** OE

**Prerequisite:** Fundamentals of computer networks, computer network topology and TCP/IP protocol suit.

**Rationale:** Wireless sensor networks (WSN) have become the most standard technical development in commercial and industrial applications. The use of WSN along with IEEE standards in Wireless Personal Area Networks (WPAN) has paved the way for effective data collections with optimum use of network resources. Ad hoc mode of wireless sensor networking is a good option for a user setting up a temporary wireless network between a small number of devices under application specific scenarios. They require minimal configuration and can be deployed quickly, which makes them suitable for emergencies, such as natural disasters or military conflicts.

**Teaching and Examination Scheme:**

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	100
3	0	0	3	60	25	15	--	--	

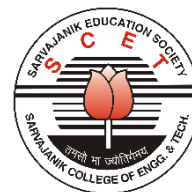
**CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

**Content:**

Sr. no.	Topics	Teaching Hrs.	Module % Weightage
1.	<b>Overview of Wireless Sensor Network:</b> Overview of OSI and TCP / IP Protocol Suit, Introduction to ad-hoc networks and Wireless Sensor Network, Node Architecture - Hardware Components – unique constraints and challenges, Enabling technologies for Wireless Sensor Networks – Types of Wireless Sensor Networks. Application of Wireless Sensor Network.	9	20
2.	<b>Architecture of WSN:</b> Network Architecture – Sensor Network Scenarios, Design principle, physical layer and transceiver design consideration, Optimization goals and figure of merit, Gateway Concepts, Operating Systems and Execution Environments – introduction to Tiny OS and nesC – Internet to WSN communication.	9	20



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<b>3.</b>	<b>Media Access and Networking for WSN:</b> MAC Protocol for Wireless Sensor Networks, Low Duty Cycle Protocols and Wake Up 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 for Energy – efficient Routing, Geographic Routing.	10	25
<b>4.</b>	<b>Infrastructure Establishment:</b> Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tracking and Control	8	20
<b>5.</b>	<b>Network Platforms and Tools for WSNs:</b> Sensor Node Hardware – Berkeley Motes, Programing challenges, Node-level software platforms, Node-level simulators, State-Centric Programing	6	15

**Suggested Specification table with Marks (Theory/Practical):**

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	30	20	10	5	5

**Legends: R:** Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels (**Revised Bloom's Taxonomy**)

**Note:** This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Reference Text Books:**

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1.	Protocol and Architecture for Wireless Sensor Networks	Holger Karl & Andreas Willig	John Wiley 9780470519233	2007	1 <sup>st</sup>
2	Wireless Sensor Network – An Information Processing Approach	Feng Zhao & Leonidas J. Guibas	Morgan Kaufmann 9781558609143	2004	1 <sup>st</sup>
3	Fundamental of Wireless Sensor Networks – Theory and Practice	Waltenegus Dargie	Kindle Scribe 9780470997659	2011	1 <sup>st</sup>
4	Wireless Sensor Networks – Technology, Protocols and Applications	Kazem Sohraby	John Wiley	2007	1 <sup>st</sup>



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**Course Outcome:**

Sr. No.	CO Statement After learning this subject students will be able to	Marks % weightage
CO-1	Describe and identify the wireless Sensor network node hardware and network architecture.	20
CO-2	Classify the challenges for implementation and deployment of Wireless adhoc and sensor network for application specific scenario.	20
CO-3	Summarize the platform -tools for implementation of Wireless sensor node for an application specific scenario.	10
CO-4	Categorize the infrastructure requirement for establishment of Wireless Sensor Network.	25
CO-5	Relate and Grade different access method for data sharing under the constraint of limited energy resources.	25

**Mapping with POs:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	-	-	-	-	-	2	3	3	2	2
CO-2	3	3	-	-	-	-	-	2	3	3	2	2
CO-3	3	3	-	-	-	-	-	2	3	3	2	2
CO-4	3	3	-	3	2	2	-	2	3	3	2	2
CO-5	3	3	-	3		2	-	2	3	3	2	2

**List of Open Source/learning website:**

- Wireless Ad hoc and Sensor Network – IIT Kharagpur, NPTEL course by Prof. Sudip Misra
- Virtual Lab / broad area – computer science –and – engineering  
<https://www.vlab.co.in/broad-area-computer-science-and-engineering>

**List of Open Source Software:**

- Network Simulator Software (NS-2, NS-3, OPNET).
- Packet tracer packages and software.