**Elective IV: Advanced Wireless Sensor Networks**

**Unit I:** Introduction to Sensor networks: application Examples of available sensor nodes, Challenges for WSN’s, Mobile ad hoc networks and wireless sensor networks, single node architecture. Sensor node hardware overview, Sensors and actuators, Energy consumption of sensor nodes

**Unit II:** Operating systems and execution environments: Programming paradigms and application programming interfaces, Structures of operating system and protocol stack. Dynamic energy and power management, TinyOS and neSc examples

**Unit III:** Network Architecture: Sensor network scenarios, Design principles for WSNs, Services interfaces of WSNs, Gateway concepts, Mac protocols: Fundamentals, Low duty cycle and Wakeup concepts, contention and schedule based protocols, IEEE 802.15.4 MAC Protocol.

**Unit IV:** Naming and Addressing: Fundamentals Address and Name management in WSN, assignment in MAC Addresses, content based and geographical addressing. Hierarchical networks by clustering, Adaptive node activity: geographic adaptive Fidelity (GAF).

**Unit V:** Routing protocols and content based networking: Broadcast and multicast protocols Geographic Routing, Mobile nodes, Data centric Routing, Distribution versus gathering of data-In-network processing, Data Aggregation, data centric storage.

**Unit VI:** Application specific support: Advanced in-network processing, security, Target detection and tracking, contour/edge detection. 38

**Text Books:** 1. Protocols and Architectures for Wireless Sensor Networks, Holger Karl, and Andreas Willig, Wiley, 2005.

2. Wireless Sensor Networks, Cauligi S. Raghavendra, Krishna Sivalingam and Taieb M. Znati, Springer, 2005.

 3. Introduction to Wireless and Mobile Systems, Third edition, Dharma Prakash Agrawal and Qing-An Zeng, Thomson/Cengage Learning, 2010.

**Reference Books:** 1. Wireless and Personal Communications Systems, Vijay K. Grag and Joseph E. Wilkes, Prentice Hall, 1995.

 2. Routing in the Internet, Christian Huitema, Prentice Hall, 1995.