Course Code: **BTCS715-18** **Course Title:** Parallel Computing lab **L: T: 2P** **Credits:** 1

The details may be designed by course instructor as per the theory.

BTCS 716-18	Adhoc and Wireless Sensor Networks	L:03, T:0, P: 0	Credits: 3

Detailed Contents:

UNIT 1: **{07hrs}(CO1)**

ADHOC AND SENSORS NETWORKS – INTRODUCTION AND ROUTING PROTOCOLS:

Wireless Sensor Networks (WSNs): concepts and architectures - Applications of Ad Hoc and Sensor Networks - Design Challenges in Ad hoc and Sensor Networks. Wireless Networks, Issues in Ad hoc wireless networks, Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV), On–Demand Routing protocols –Ad hoc On–Demand Distance Vector Routing (AODV).

UNIT2: **{09hrs}(CO2)**

WSN NETWORKING CONCEPT AND MAC PROTOCOLS :

Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks - Design Goals of a MAC Protocol for Ad Hoc Wireless Networks, MAC Protocols for wireless sensors Networks, Low duty cycle Protocols and Wakeup concepts, Classification of MAC Protocols , S-MAC, Contention based protocols -PAMAS schedule based protocols –LEACH, IEEE 802.15.4. MAC protocols , Energy efficient routing challenges and issues in transport layer

UNIT 3: **{06hrs}(CO3)**

ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS:

Routing Protocol: Issues in designing a routing protocol for Ad hoc networks - Classification- proactive routing - reactive routing (on-demand) - hybrid routing - Transport Layer protocol for Ad hoc networks - Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks -Classification of Transport Layer solutions-TCP over Ad hoc wireless ,

UNIT4: **{06hrs}(CO4)**

SENSOR NETWORKS INTRODUCTION AND ARCHITECTURES:

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks, WSN application examples, Single-Node Architecture – Hardware Components, Energy Consumption of Sensor Nodes, Network Architecture – Sensor Network Scenarios, Transceiver Design Considerations.

UNIT 5: **{07hrs}(CO5)**

SENSOR NETWORK SECURITY- NETWORK SECURITY :

Security in Ad Hoc Wireless Networks - Network Security Requirements. Network Security requirements issues and Challenges in security provisioning Network, Security Attacks. Layer wise attack in wireless sensor networks, possible

solutions for Jamming, tampering black hole attack, Flooding attack, Key distribution and Management, Secure Routing -SPINS reliability requirements in sensors Networks. Sensor Network Platforms and Tools

Course Outcomes:

After undergoing this course, the students will be able to:

CO Nos.	Course Outcomes:
CO1	Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks and apply this knowledge to identify the suitable routing algorithm based on the network.
CO2	Apply the knowledge to identify appropriate physical and MAC layer protocols
CO3:	Understand the transport layer and Describe routing protocols for ad hoc wireless networks with respect to TCP design issues
CO 4	Be familiar with the OS used in Wireless Sensor Networks and build basic modules CO 5:
CO 5	Understand the Challenges in security provisioning ,Security Attacks and security issues possible in Adhoc and Sensors Networks

Suggested Readings/ Books:

Text Books:

1. C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols ", Pearson Education, 2008.
2. Labiod. H, “Wireless Adhoc and Sensor Networks”, Wiley, 2008.
3. 3. Li, X, “Wireless ad -hoc and sensor Networks: theory and applications”, Cambridge University Press, 2008.

Reference Books

1. Carlos De Morais Cordeiro, Dharma Prakash Agrawal “Ad Hoc & Sensor Networks: Theory and Applications”, world Scientific Publishing Company, 2nd edition, 2011.
2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication
3. Holger Karl and Andreas Willig “Protocols and Architectures for Wireless Sensor Networks”, Wiley, 2005 (soft copy available) .
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks Technology, Protocols, and Applications”, John Wiley, 2007. (soft copyavailable).
5. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.(soft copy available)

Online Resources:

1. www.wirelessnetworksonline.com
2. www.securityinwireless.com
3. www.ida.liu.se/~petel71/SN/lecture-notes/sn.pdf Practice Aspects 1. NS2 Simulator tool

BTCS 717-18	Adhoc and Wireless Sensor Networks Lab	L:0, T:0, P: 2	Credits: 1

List of Experiments :

Sr. No	Name and list of Practical
1	Introduction of Wireless sensor network applications and its simulation
2	Network Simulator installation of wireless sensor network.
3	Implementation of routing protocol in NS2 for DSR protocol
4	Study other wireless sensor network simulators (Mannasim. Contiki
5	Implementation of routing protocol in NS2 for AODV protocol for TORA protocol