

Wireless Communication Technology for the IoT

Unit 1: Wireless Personal Area Network

Evolution of Personal Area Networks - WPAN technologies, issues and challenges, Models and architecture, IEEE 802.15 WPAN Standards: IEEE 802.15.1 Bluetooth, IEEE 802.15.3 High Rate WLAN, IEEE 802.15.4 Low Rate WPAN, IEEE 802.15.5 Mesh WPAN

Unit 2: IoT Overview

Internet of Things Definition, Evolution, IEEE SA's IoT, IoT Architectures, Resource management, IoT Data management and analytic, communication protocols, Identity Management and authentication, Standardization and Regulatory Limitations, IoT Applications

Unit 3: IoT Data Link Layer and Network Layer Protocols

IEEE 802.15.4e, IEEE 802.11 ah, WirelessHART, Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7, HomePlug, LTE-A, LoRaWAN, DECT/ULE.

RPL, CORPL, CARP. Encapsulation Protocols: 6LoWPAN, 6TiSCH, IPv6 over G.9959, IPv6 over Bluetooth Low Energy.

Unit 4: IoT Transport Layer Protocols

CoAP, XMPP, RESTful, HTTP MQTT. Management Protocol: Interconnection of Heterogeneous Data link, Smart Transducer Interface.

Unit 5: Security & Privacy in the IoT

IoT security Overview, Security Framework for IoT, Privacy in IoT Network, IoT Robustness & Reliability, Obfuscation & Diversification techniques for Securing IoT, Security in IoT protocols.

Text Books:

1. Vijay Garg, Wireless Communications & Networking, Morgan Kaufmann Series in Networking, 2007.
2. Rajkumar Buyya, Amir Vahid Dastjerdi, Internet of Things: Principles and Paradigms, Morgan Kaufmann, 2016.
3. Fei Hu, "Security and privacy in internet of things (IoTs) : models, algorithms, and implementations". CRC Press, 2016.

Reference Books:

1. Kaveh Pahlavan and Prashant Krishnamurthy, "Networking Fundamentals: Wide, Local and Personal Area Communications", John Wiley & Sons, 2009.
2. Adrian McEwen and Hakim Cassimally, "Designing the Internet of Things", John Wiley & Sons, 2013.
3. David Boswarthick, Omar Elloumi Olivier Hersent, The Internet of Things: Key Applications and Protocols, Wiley Publisher, 2015.
4. IEEE Standard Association for 802.15 Series.