Syllabus of Proposed Open Elective for BE (E & TC)

404190: Advanced Trends in Telecommunication

Teaching Scheme:

Lectures: 4 hrs/ Week

Examination Scheme

Paper: 100 Marks (3 hrs Duration)

Unit I

Wireless Ad-hoc and Sensor Networks

Introduction of ad-hoc/sensor networks, Key definitions of ad-hoc/sensor networks , Advantages of ad-hoc/sensor networks, Unique constraints and challenges, Driving Applications, Wireless Communications/Radio Characteristics , Ad-Hoc wireless networks , Media Access Control (MAC) Protocols, Issues in designing MAC protocols , Classifications of MAC protocols, Routing Protocols, Issues in designing routing protocols , Classification of routing protocols, Routing protocols, Networking Sensors, Unique features , Deployment of ad- hoc/sensor network, Sensor tasking and control. **(8 Hours)**

Unit II

Internet of Things (IoT)

IoT Vision, Conceptual framework of IoT, Role of RFID in IoT, Applications of IoT, Ubiquitous computing, virtualization of network resources and physical devices in IoT, Interoperability, Standardization and Governance in the era of IoT. **(8 Hours)**

Unit III

Green Information and Communication Technology (ICT)

Smart Grid Concept, smart meters, Grid side & Customer side, Smart City, Electric vehicles, Substation and feeder monitoring, Wide area measurement (WAM), Distributed generation support, Energy measurements, Intelligent housing, Life-cycle efficient production, Use cases. **(8 Hours)**

Unit IV

Software Defined Radio and Cognitive Radio Networks

The motivation and purpose, Implementation scenarios and issues, Heterodyne Architecture of SDR, Related Technologies, Constraints for coexistence, Multi-channel modulations, Wideband RF processing, RF/IF re-configurability , Introduction to Cognitive Radio concept,

motivation and purpose, Spectrum Sensing, Spectrum Sharing, Spectrum Mobility, Spectrum Management, Regulatory Issues, Implications of Cognitive Radio Networks. **(8 Hours)**

Unit V

Cooperative Communications and Networks

Introduction to the cooperative communication, Basic techniques, MIMO and Smart Antennas, Purpose, benefit and drawbacks, Applications of Cooperative Communications, Implementation scenarios and issues, Introduction to Advanced Issues in Cooperative Communication, Use cases. **(8 Hours)**

Unit VI

Wireless Aspects of Tele-healthcare

The application of advanced telecommunication, the special requirements especially related to reliability, privacy and trust, Regulatory and safety aspects of tele-healthcare, Cognitive radio and flexible spectrum usage for tele-healthcare, Cooperative Communications for Tele-health , Use cases. **(8 Hours)**

Text Books:

1. XiangYang Li, "Wireless Ad Hoc and Sensor Networks-Theory and Applications" Cambridge University Press.
2. Markus Dillinger, Kambiz Madani, Nancy Alonistioti," Software Defined Radio: Architectures, Systems and Functions". (Wiley Series in Software Radio)

Reference Books:

1. Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning, "The Internet of Things: From RFID to the Next-Generation Pervasive Networked Systems".
2. Dieter Kranzlmüller, A Min Tjoa, "Information and Communication on Technology for the Fight against Global Warning - ICT-GLOW 2011".
3. 5. Alexander M. Wyglinski, Maziar Nekovee, Thomas Hou, "Cognitive Radio Communications and Networks: Principles and Practice".