

## **EC6014 COGNITIVE RADIO**

### DETAILED SYLLABUS

#### **OBJECTIVES:**

The student should be made to:

- Know the basics of the software defined radios.
- Learn the design of the wireless networks based on the cognitive radios
- Understand the concepts of wireless networks and next generation networks

#### **UNIT I INTRODUCTION TO SOFTWARE DEFINED RADIO**

Definitions and potential benefits, software radio architecture evolution, technology trade-offs and architecture implications.

#### **UNIT II SDR ARCHITECTURE**

Essential functions of the software radio, basic SDR, hardware architecture, Computational processing resources, software architecture, top level component interfaces, interface topologies among plug and play modules.

#### **UNIT III INTRODUCTION TO COGNITIVE RADIOS**

Marking radio self-aware, cognitive techniques – position awareness, environment awareness in cognitive radios, optimization of radio resources, Artificial Intelligence Techniques.

#### **UNIT IV COGNITIVE RADIO ARCHITECTURE**

Cognitive Radio - functions, components and design rules, Cognition cycle - orient, plan, decide and act phases, Inference Hierarchy, Architecture maps, Building the Cognitive Radio Architecture on Software defined Radio Architecture.

#### **UNIT V NEXT GENERATION WIRELESS NETWORKS**

The XG Network architecture, spectrum sensing, spectrum management, spectrum mobility, spectrum sharing, upper layer issues, cross – layer design.

#### **TEXT BOOKS:**

1. Joseph Mitola III, “Software Radio Architecture: Object-Oriented Approaches to Wireless System Engineering”, John Wiley & Sons Ltd. 2000.
2. Thomas W. Rondeau, Charles W. Bostain, “Artificial Intelligence in Wireless communication”, ARTECH HOUSE .2009.
3. Bruce A. Fette, “Cognitive Radio Technology”, Elsevier, 2009.
4. Ian F. Akyildiz, Won – Yeol Lee, Mehmet C. Vuran, Shantidev Mohanty, “Next generation / dynamic spectrum access / cognitive radio wireless networks: A Survey” Elsevier Computer Networks, May 2006.