EC 823 Cognitive Radio System

ECE

Unit 1: Overview of Software defined radio, Cognitive radio.

Concept of Cognitive Radio, Benefits of Using SDR, Problems Faced by SDR, CognitiveNetworks, Cognitive Radio Architecture.

Unit 2: Introduction to MIMO, OFDM for Cognitive Radio.

A Basic OFDM System Model, OFDM based cognitive radio, Challenges to Cognitive OFDM Systems. MIMO channel estimation, Multi-band OFDM, MIMO-OFDM synchronization and frequency offset estimation.

Unit 3: The Cognitive Engine.

Cognitive Radio Design, Cognitive Engine Design, Artificial Intelligence Techniques, Genetic Algorithms for Radio Optimization, Decision Making with Case-Based Learning.

Unit 4: Spectrum Sensing Techniques.

Spectrum Sensing to detect Specific Primary System, Spectrum Sensing for Cognitive OFDMA Systems, Spectrum Sensing for Cognitive Multi-Radio Networks.

Unit 5: Applications of Cognitive Radio.

Cognitive Wireless Communication Applications - Resource Optimization, Interoperability, End User Product/ Service Specific Cognitive Wireless, Cognitive Application Challenges.

Reference books:

1. "Cognitive Radio, Software Defined Radio and Adaptive Wireless Systems" by Hüseyin Arslan, University of South Florida, USA, Springer, and ISBN: 978-1-4020-5541-6.

2. "Cognitive Radio Networks" by Kwang-Cheng Chen, Ramjee Prasad, Wiley, 2009-06-15, ISBN: 0470696893.

3. "Artificial Intelligence in Wireless Communications" by Thomas W. Rondeau, Charles W.Bostian, ISBN: 978-1-60783-234-8.

4. "Quantitative Analysis of Cognitive Radio and Network Performance" by Preston Marshall.

5. Jui-Ping Lien; et al., "Design of a MIMO OFDM baseband transceiver for cognitive radio system", IEEE International Symposium on Circuits and Systems, ISCAS 2006.

6. RyojiHashimoto; et al., "Implementation of OFDM Baseband Transceiver with Dynamic Spectrum Access for Cognitive Radio Systems", 9th International Symposium on communications and Information Technology, 2009.

7. Hatanaka; et al., M. "VLSI design of OFDM baseband transceiver with dynamic spectrum access" International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS), 2010.

Mos - PB/BM. for Senate