COURSE TITLE	**SPREAD SPECTRUM COMMUNICATIONS**
COURSE CODE	**01CT0814**
COURSE CREDITS	**3**

Objective:

1. Spread spectrum communications is a core technology for wireless systems. Future cellular systems are virtually all being designed using spread spectrum techniques. A large number of wireless LAN products are being designed using spread spectrum. Many military systems use spread spectrum. In short, wireless communication engineers will almost certainly work on spread spectrum systems during their career. Since the design methods for spread spectrum and the principles behind them are significantly different from other communication system it is important to understand course.
2. The course focuses on learning fundamental aspects in terms of providing secure and reliable communications by spreading the signals over large frequency bands along with intercepting and jamming of signals in the same frequency band.
3. The objective of the course is to provide students with a comprehensive understanding of the principles, techniques, and applications of spread spectrum communication systems and prepare them for careers in telecommunications, wireless communication, and related fields.

Course Outcomes: After completion of this course, student will be able to:

1. Describe the types and advantages of spread spectrum modulation formats.
2. Describe the differences and benefits of different types of spreading codes.
3. Analyze the performance of spread spectrum systems in the presence of interference.
4. Analyze the performance of multiple access techniques based on spread spectrum (i.e. CDMA)
5. Analyze the performance of multiple access techniques based on spread spectrum (i.e. CDMA)
6. Describe the major factors influencing the capacity of CDMA in wireless networks

Pre-requisite of course: Digital Communication and fundamentals of Wireless Communications

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	25	25

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Contents : Unit	Topics	Contact Hours
1	**Module** Introduction to Digital communications and Spread Spectrum, Direct Sequence Spread Spectrum, Frequency Hopping, Pseudo-random sequence generation, Synchronization Issues for Spread-Spectrum, Performance analysis of Direct-Sequence Spread Spectrum, Frequency-Hopped Spread-Spectrum, and CDMA.	42
Total Hours		**42**

Textbook :

1 Introduction to Spread Spectrum Communications, R. L. Peterson, R. E. Ziemer and D. E. Borth, Pearson Education, 1995

2 Spread Spectrum Communications Handbook, M. K. Simon, J. K. Omura, R. A. Scholtz and B. K. Levitt , HANDBOOK, 2000

3 Spread spectrum Systems, Robert C. Dixon, Wiley & Sons, Incorporated, 1994

4 Principles of Spread Spectrum Communication Systems, D. Torrieri, Springer, 2005

5 CDMA Systems capacity Engineering, K. Kim and I. Koo, Artech House, 2005

6 Spread Spectrum Systems for GNSS and Wireless Communications, J. K. Holmes , Artech House Publishers, 2007

References:

1 MOOC Course, NPTEL, COURSERA, Udemy

2 Modern Communications Jamming Principles and Techniques, Modern Communications Jamming Principles and Techniques, R. A. Poisel, 2nd Ed., Artech House, 2011

3 Adaptive WCDMA: Theory and Practice, Adaptive WCDMA: Theory and Practice, Savo G. Glisic, Wiley, 2003

4 Signal design for Good Correlation, Signal design for Good Correlation, S. W. Golomb and G. Gong, Cambridge Univ. Press, 2005

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	40.00	30.00	0.00	0.00

Instructional Method:

1 Students may use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory, etc.

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Supplementary Resources:

1 MOOC Course, NPTEL, COURSERA, Udemy

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