The field of wireless communications has witnessed revolutionary technology developments in the last decade. While previously there existed only 2G GSM based communication systems which supported a data rate of around 10 Kbps, several radical wireless technologies have been developed in the last 10 years to enable broadband wireless access with rates in excess of 100 Mbps. These have subsequently led to the development of 3G and 4G wireless technologies such as HSDPA (High Speed Downlink Packet Access), LTE (Long Term Evolution) and WiMAX (Worldwide Interoperability for Microwave Access). This has been made possible through breakthrough wireless technologies such as Code Division for Multiple Access (CDMA), Orthogonal Frequency Division Multiplexing (OFDM), Multiple Input Multiple Output (MIMO). These techniques form the basis of understanding the world of 3G/4G wireless communication systems. This course will present an elaborate introduction to the principles and performance of these fundamental 3G/4G wireless technologies.

INTENDED AUDIENCE: The intended audience is students, practicing engineers, technical and non-technical managers of telecom companies, students preparing for competitive exams with communication engineering subject

PRE-REQUISITES: Basic knowledge of - Probability, random variables, Digital modulation, BPSK, QPSK etc.

INDUSTRIES APPLICABLE TO: Most companies in the wireless communications area should find this useful. Examples are Qualcomm, Broadcom, Intel etc.

COURSE OUTLINE:

Week 1: Introduction to Wireless Systems
Week 2: Performance in Fading wireless channels
Week 3: Multiple Antenna Wireless Systems and Diversity
Week 4: Wireless Channel Characterization - Delay Spread and Doppler
Week 5: Principles of CDMA Wireless Communication
Week 6: Principles of MIMO Wireless Communication
Week 7: Principles of MIMO Wireless Communication (Continued)
Week 8: Principles of OFDM Wireless Communication

ABOUT INSTRUCTOR:
Prof. Aditya K. Jagannatham (http://home.iitk.ac.in/~adityaj/index.html) received his Bachelors degree from the Indian Institute of Technology, Bombay and M.S. and Ph.D. degrees from the University of California, San Diego, U.S.A.. From April '07 to May '09 he was employed as a senior wireless systems engineer at Qualcomm Inc., San Diego, California, where he worked on developing 3G UMTS/WCDMA/HSDPA mobile chipsets as part of the Qualcomm CDMA technologies division. His research interests are in the area of next-generation wireless communications and networking, sensor and ad-hoc networks, digital video processing for wireless systems, wireless 3G/4G cellular standards and CDMA/OFDM/MIMO wireless technologies. He has contributed to the 802.11n high throughput wireless LAN standard and has published extensively in leading international journals and conferences.