

Organized by Prof. Aditya K. Jagannatham, EE Department, IIT Kanpur
November 13th - 19th, 2019

**MATLAB Project Course on
Design and Performance Analysis
of 5G Wireless Systems: mmWave
MIMO, Massive MIMO, NOMA,
FBMC, Full Duplex and IoT**



Important Dates

Course Dates
November 13th - 19th, 2019

Last Date for Registration
October 28th, 2019

Venue

Seminar Hall,
Pioneer Batch Building,
Visitor's Hostel,
IIT Kanpur,
Kanpur 208016,
Uttar Pradesh, India

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This course will cover the design, analysis, implementation and optimization of 5G wireless systems based on the cutting edge **mmWave MIMO, Massive MIMO, NOMA, FBMC, Full Duplex and IoT** technologies. These revolutionary technologies have enabled the realization of the three key goals of 5G - data rates in excess of 10 Gbps, connectivity to support 1 million per square kilometre device density and sub millisecond latencies. Together, these technologies form the cornerstone in the realization of path breaking applications such as drone communications, vehicle-to-vehicle and vehicle to infrastructure communication (V2X), augmented/ virtual reality (AR/ VR), and several others. In particular, mmWave MIMO will enable extreme capacity and speeds by exploiting high frequency bands, while Massive MIMO can deploy a large number of antennas (250 – 500) to achieve a 10X increase in the number of multiplexed users. Finally, NOMA, which enables non-orthogonal asynchronous transmission, can integrate a massive number of sensor devices in the 5G ecosystem towards the development of smart cities and smart grids.

The main focus of this one week course is to present an in-depth coverage of all the 5G technologies along with the most recent trends in published research papers. The highlight of the course is the last two days that will focus exclusively on **MATLAB implementation of the 5G techniques** by all the participants to derive deep insights into system design and performance. Distinguished experts from the wireless industry will also deliver guest lectures on state-of-the-art developments in research and implementation. Participants will be exposed to detailed lectures and dedicated tutorial problem solving sessions pertaining to all aspects of 5G technologies such as Pre-coder/ Combiner Design, Analog/ Digital Beamforming, Hybrid Signal Processing Architectures, Sparse Signal Processing, Equalization, Successive and Self Interference Cancellation etc.

Target Audience

- Ph.D. scholars pursuing research in 5G technologies
- M.Tech/ B.Tech students undertaking thesis/ projects in 5G technology
- Faculty members of Engineering Institutions/ Universities
- Engineers from Wireless Industry and R&D Organizations