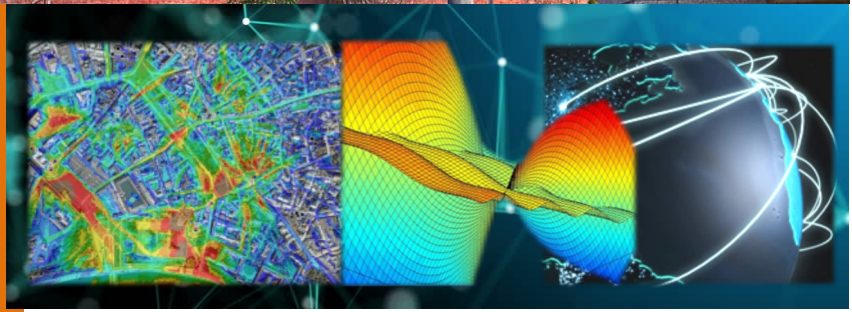


Organized by :  
Department of Electrical Engineering, IIT Kanpur

Short Course  
on  
Theory and Simulation of  
Massive MIMO & MmWave  
5G NR Cellular Networks



### Important Dates

#### Course Dates

May 27 - May 31 2019

#### Last Date for Registration

April. 30, 2019

### Venue

Seminar Hall  
Pioneer Batch Building  
IIT Kanpur

### Contact

#### WIRELESS

Department of  
Electrical Engineering  
IIT Kanpur  
Kanpur 208016  
UP, India

### E-mail

wireless@iitk.ac.in



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Over the last few decades, wireless cellular systems have evolved significantly. The last decade saw successful development and commercialization of 4G cellular networks, which successfully incorporated techniques such as capacity-achieving turbo code, adaptive modulation and coding, and MIMO techniques. The 5G cellular networks, which are currently being developed, will incorporate techniques such as massive MIMO with up to 128 antennas at the base station, and millimeter waves.

The 5G systems development transcends three domains: theoretical research, numerical simulations and practical system demonstrations. This course aims to be a balanced mixture of theory, simulation and practice, which are required to design, evaluate and finally demonstrate practical 5G cellular networks. The course will provide an in-depth exposure to practicing engineers, faculty members and graduate students to the fundamentals of wireless communication and the key advanced wireless techniques behind the successful development of modern 4G and 5G systems. Beginning with a brief overview of the basic concepts of wireless communications, multiple access schemes, this course will cover fundamentals of 5G new radio (NR) standard, transceiver design for MIMO, massive MIMO, device-to-device systems, and analysis of 5G millimeter wave systems. This course will also cover the following laboratory sessions in MATLAB and NetSim:

1. Link level simulations to compute the performance of OFDM system using MATLAB
2. System level simulations to compute performance of cellular and ad-hoc systems using MATLAB
3. System level simulations of 5G millimeter wave networks highlighting its distinctions and novelties.
4. A hands-on network-based simulations session using NetSim.

The course will demo the 5G NR testbed and applications being developed at IITK. The course will additionally have a speaker from Industry.

### Target Audience

- Practicing wireless system engineers.
- Graduate students pursuing research in wireless communications.
- Teachers of government and private engineering colleges.

For more details and registration information, visit the website  
<http://www.iitk.ac.in/ee/wireless>