विद्युत अभियांत्रिकी विभाग
DEPARTMENT OF ELECTRICAL ENGINEERING
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31st March, 2019

Dear Prof./ HoD/ Student,

A ***one-week*** short course on "**5G Wireless Technologies: Massive MIMO, mmWave MIMO, NOMA, Full Duplex (FD), OFDM/ FBMC and NB-IoT**" is being organized by **IIT Kanpur** in **Bangalore** from July 8th to 14th, 2019, *in association with E&C Department, Ramaiah Institute of Technology, Bengaluru*. This is the first comprehensive course dedicated to fully covering all the latest 5G technologies. The course will introduce the participants to various advanced techniques such as, Precoding/ Combining, Hybrid Signal Processing, Analog/ Digital Beamforming, FBMC-OQAM systems, SIC for NOMA, Self-Interference Cancellation, 5G NR and NB IoT standards. It is focused towards B.Tech/ M.Tech/ Ph.D. students, faculty members and industry participants seeking to learn about the latest 5G technologies and gain insights. Several *projects* will also be conducted to introduce participants to hands-on implementation and detailed *lecture notes + tutorials + solutions + program code* will be provided to the participants. Detailed course information can be found at website below

https://www.iitk.ac.in/mwn/BANG5G/

I request you to display the attached ***course flyer*** in your institution. Topics to be covered are below

1. Overview of 5G Wireless Technologies
2. Key Parameters and Specs for 5G
3. Signal Processing for MIMO
4. Overview of Massive MIMO for 5G
5. Comparison of Massive MIMO with Point-to-Point and MU-MIMO
6. Architectures for Massive MIMO
7. Channel Modeling for Massive MIMO
8. Transmitter/ Receiver Design for Massive MIMO
9. Channel Estimation in Massive MIMO
10. Massive MIMO with Imperfect CSI
11. Multi-Cell Massive MIMO, Pilot Contamination
12. Spatial Modulation (SM), SSK
13. Generalized Spatial Modulation (GSM)
14. Overview of mmWave MIMO
15. Analog/ Digital Beamforming
16. Hybrid mmWave MIMO Architecture
17. mmWave MIMO Channel Modeling
18. Channel Estimation for mmWave MIMO
19. Transceiver Design for mmWave MIMO
20. Overview of FBMC Technology
21. Comparison of FBMC with OFDM
22. Overview of NOMA Technology
23. Performance Comparison of NOMA
24. Performance Analysis of fixed NOMA
25. Performance Analysis of ordered NOMA
26. FBMC Implementation, FBMC-OQAM
27. Signal Processing for MIMO-FBMC
28. Full-Duplex, Self-Interference Cancellation
29. Overview of 5G New Radio (NR) Standard
30. Overview of NB-IoT Standard
31. MATLAB Project on Massive MIMO
32. MATLAB Project on SM, SSK
33. MATLAB Project on mmWave MIMO Channel Est
34. MATLAB Project on Precoder/ Combiner Design for mmWave MIMO
35. MATLAB Project on NOMA Systems
36. MATLAB Project on FBMC, MIMO-FBMC

Please do not hesitate to contact us for any further information
Thanking you,

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