

Short Term FDP on Towards 5G: The Key Enabling Technologies

Under the banner of
Electronics and ICT academy at National
Institute of Technology Patna

5-14 December, 2016



Patron

Prof. (Dr.) Asok De
Director, NIT Patna

Coordinators

Dr. Seemanti Saha
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Organized by

Electronics and ICT Academy, National Institute of
Technology Patna, Patna- 800005. India.
www.nitp.ac.in/ict/

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Department of Electronics and Information
Technology, DeitY (presently - MeitY),
Ministry of Communication and Information
Technology, Govt. of India.



About NIT Patna

National Institute of Technology Patna is the 18th National Institute of Technology created by the Ministry of H.R.D. Government of India after rechristening the erstwhile Bihar College of Engineering Patna on 28.01.2004. The Institute is situated on the south bank of holy river Ganges behind Gandhi Ghat (where the ash of father of the Nation, Mahatma Gandhi was offered in the river Ganges). The Institute imparts high level education training, research and development in science, engineering technology and humanities along with high quality education and values at UG, PG and Ph.D. level. At present the Institute offers courses in six major technical disciplines viz. Architecture, Civil Engineering, Computer Science & Engg., Electrical Engg., Electronics & Communication Engg. and Mechanical Engg. It also consists of well-established departments of Physics, Chemistry, Mathematics and Humanities and Social Sciences.

Electronics and ICT Academy

Ministry of Electronics and Information Technology, Government of India has instituted seven Electronics and Information & Communications Technology (ICT) Academies of which, the academy of NIT Patna is one. The Academy at NIT Patna aims to design and organize basic as well as specialized training programmes in niche areas of electronics and ICT for the development of required knowledge base, skills and tools to equip the teaching community with better knowledge and understanding.

Objective and Scope

The objective of this course is to elucidate upon the various key technologies going to be used in the upcoming 5G standard. The following are the broad topics, going to be covered in this course:

- ✚ Fundamentals of digital and wireless communications
- ✚ Fundamentals of OFDM, MIMO, MU-MIMO and Massive-MIMO technologies
- ✚ Full-Duplex communications
- ✚ Introduction to mm-wave and its role in 5G
- ✚ Antennas and propagation for 5G communications
- ✚ GFDM, Spatial modulation, NOMA etc. for 5G
- ✚ Heterogeneous networks
- ✚ Cognitive radio in 5G
- ✚ 5G in medical scenario

- ✚ IoT, D2D Communications
- ✚ 5G in smart city
- ✚ Optical wireless communications

One of the key features of this course is that, along with discussing the advanced research topics and cutting edge technologies, it will encompass fundamental aspects of digital and wireless communication as well. Moreover, there will be substantial amount of practical lab hours, where the attendees will get opportunity to carry out interesting hands on experiments in the area of wireless communication and wireless propagation using various advanced instruments like NI USRP-Rio (up to 4 GHz), Agilent VNA (up to 26.5 GHz), Agilent Signal Analyzer (up to 26.5 GHz), Antenna training setup, etc. Some labs will be conducted by industry personnel from NI, Rohde & Schwarz, Amitec, etc.

One unique feature of this course will be demonstrating the interdisciplinary nature of 5G research, which requires knowledge of antenna, wireless propagation channel, wireless front-end along with the knowledge of the physical layer and network layer aspects of 5G communication. Keeping this in mind, the experts for this course are invited from various specializations like wireless communication, antenna engineering, microwave engineering etc.

Resource Persons

Internationally acclaimed faculty members from premier institutions like IISc Bangalore, various IITs, NITs, ISI Kolkata, IIIT Delhi, IIST, etc. including number of IEEE Fellows. Along with that, highly experienced industry personnel from companies like SAMEER, DRDO DEAL Lab, TCS R&D, Qualcomm, National Instruments, Rohde & Schwarz and others. The following are the name of few eminent speakers, who have already agreed to take part in this programme.

- **Prof. Ramjee Prasad, Aalborg University, Denmark**
- **Prof. A. Chockalingam, IISc Bangalore**
- **Prof. R. K. Mallik, IIT Delhi**
- **Prof. B. P. Sinha, ISI Kolkata**
- **Prof. Saswat Chakrabarti, IIT Kharagpur**
- **Prof. Ajay Chakraborty, IIT Kharagpur**
- **Prof. Ashok De, NIT Patna**
- **Prof. K. Giridhar, IIT Madras**
- **Prof. Swades De, IIT Delhi**
- **Prof. Ketan Rajawat, IIT Kanpur**
- **Prof. Preetam Kumar, IIT Patna**
- **Prof. Debarati Sen, IIT Kharagpur**

- Prof. P. K. Upadhyay, IIT Indore
- Prof. Vivek Bohara, IIIT Delhi
- Prof. Sumit Darak, IIIT Delhi
- Prof. Chinmoy Saha, IIST Trivandrum
- Dr. Tapas Chakraborty, Innovation Lab, TCS
- Dr. Chandrasekaran, CEIWT, IIT Madras
- Dr. Ajay Malik, DEAL Lab, Dehradun
- Mr. Arijit Majumder, SAMEER-Kolkata
- Dr. Vinosh James, Qualcomm, Bangalore

Who Can Participate

Faculty members of UGC/AICTE recognized Universities and Engineering colleges all over India, research scholars, M. Tech. final year students, practicing Communication and RF & microwave engineers, professionals and functional managers, administrators in the mobile phone industry who would like to go through guided tour of various aspects of upcoming 5G technologies and its standardization. However there are very limited number of seats for Ph.D./PG students; priority will be given to Ph.D. students.

Registration Fee

- ✚ Faculty Member: INR 2500
- ✚ Ph.D/PG Students (External): INR 1500
- ✚ Ph.D/PG Students (Internal): INR 1000
- ✚ Industry Personnel: INR 5000

Registration fee includes Registration kit, Working lunch, Tea and Snacks and a Course Completion Certificate. **Certificate will be given by Electronics & ICT Academy NIT Patna.**

Registration Process

Filled in application form (downloaded from the website www.nitp.ac.in) in the prescribed format duly signed along with the demand draft has to be sent to the coordinator by post to **Dr. Bharat Gupta, Assistant Professor, Department of Electronics and Communication Engineering, NIT Patna, Patna-800005 (Bihar), INDIA.** The selection will be done on First Come First Serve basis and the confirmed candidates will be notified immediately. It is also mandatory to send scanned copy of filled application form and DD through mail to wireless@nitp.ac.in and cc to seemanti@nitp.ac.in. The DD must be drawn in favour of “**Director, NIT Patna**” payable at Patna. Registration fee can also be deposited through NEFT and the hard copy of bank transaction has to be

attached with the application. The bank details are as follows:

Bank Name: Allahabad Bank, NIT Patna
A/c No: 20353663911
IFSC Code: ALLA0212286
A/c Holder Name: Registrar, NIT Patna

Last date of submission of application: 02.12.2016

Accommodation

Accommodation will be provided in hostels as per the availability with nominal charges. Very limited number guest house rooms are available for attendees.

Location

Patna Railway Junction is well connected to almost all parts of the India. NIT Patna is located within a distance of only about 6 km from the Patna Railway Junction. Also Patna Jay Prakash Narayan International Airport is well connected via Air to the whole India. There are direct flights to Patna from Kolkata, Delhi, Chennai, Mumbai, Bengaluru, etc. The Institute is located within a distance of about 11 km from the airport. Taxis, Auto-rickshaws, are available as conveyance.

Address for Correspondence

Enquires should be addressed to:

Dr. Seemanti Saha, Assistant Professor
 Dept. of Electronics and Communication Engineering,
 National Institute of Technology Patna,
 Patna-800005.
 Mob. No.: +91-8002897908
 Email: seemanti@nitp.ac.in, wireless@nitp.ac.in

Advisory Committee

Prof. Preetam Kumar, IIT Patna
 Prof. D. K. Singh, NIT Patna
 Prof. G. Pradhan, H.O.D., ECE, NIT Patna
 Prof. U. S. Triar, H.O.D., EE, NIT Patna

Organising Committee

Prof. R. K. Mishra, NIT Patna
 Prof. J. Ghosh, NIT Patna
 Prof. B. C. Sahana, NIT Patna
 Prof. Rakesh Ranjan, NIT Patna
 Dr. Asit Narayan, Dy Registrsr, NIT Patna

Short Term FDP on Towards 5G: The Key Enabling Technologies (December 5-14, 2016)

REGISTRATION FORM

1. Name (block letter):
2. Designation
3. Organization:
4. Address for communication:
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- Pin code: Ph. No.:
Fax No.:
- E-mail:
5. Highest Academic Qualification:
6. Specialization:
7. Experience (in years):
(a) Teaching:
(b) Industrial:
9. DD No. : Date:
Bank Name:
Amount:
10. Accommodation: Yes/No.....

Please register me for the course on “**Towards 5G: The Key Enabling Technologies**” to be held at NIT Patna

Place:

Date:

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Signature of the applicant