5G and Emerging Technologies

Future Tech Learning & SkillingCenter

Future Tech Learning & Skilling Center of Education Research and Network (ERNET, India)
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This webinar series contains an interesting mix of flavours of theoretical rigor and practical impacts with speakers from varied backgrounds working in academia & industry giving a holistic picture of "5G & Emerging Technologies" .

WEBINAR SCHEDULE

Session 1: Foundations of 5G
Wednesday, 22nd July 2020 at 11:30am- 1:00pm (IST)

Session 2: Understanding 5G NR Call Flow
Friday, 24th July 2020 at 11:30am- 1:00pm (IST)

Session 3: IoT in the context of 5G
Monday, 27th July 2020 at 11:30am- 1:00pm (IST)

Session 4: Li-Fi in the context of 5G
Wednesday, 29th July 2020 at 11:30am - 1:00pm (IST)

Speakers

Session 1

Dr. Gourab Ghatak
Assistant Professor (ECE)
IIIT Delhi

Session 2

Mr. Asish Jain
Application Segment Manager –Keysight

Session 3

Dr. Vivek Bohara
Associate Professor (ECE)
IIIT Delhi

Session 4

Prof. Anand Srivastava
Professor (ECE)
IIIT Delhi

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RSVP : Mr. Abhishek Antil, Project Manager, SE&ET Division, ERNET India

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Day 1: Session 1 : Foundations of 5 G

July 22nd 2020, from 11:30AM- 1:00PM

Dr. Gourab Ghatak
Assistant Professor (ECE)
IIIT Delhi

About the Speaker:
Dr. Gourab Ghatak has received the B.Tech. degree from NIT Durgapur, in 2013, and M.Tech. degree from the IIT Kanpur, in 2015. During his masters, he was a DAAD Research Scholar in the Vodafone Chair Mobile Communications Systems, TU Dresden, Germany, from 2014 to 2015, where he worked on channel estimation schemes for GFDM. He has obtained his Ph.D. degree with a thesis on multi-RAT 5G networks from Telecom ParisTech (ENST), France. He is the main inventor of 4 patents and the author of several journals and conference publications

Brief on the session:
This seminar will contain an interesting mix of flavours of theoretical rigor and practical impact. It will commence with an introduction to the tools for wireless network modeling. Then it will build upon the learned tools to model several features of 5G systems such as mm-wave communication, massive MIMO, ultra-dense networks, etc. A notion of the key performance indicator metrics for the users in 5G systems will be developed.

What you will learn:

- 5G Use Cases
- 5G Enabling technologies
- A brief overview of 5G architecture
- Key performance indicators
- 5G spectrum
- Standardization
- 5G access network
- Early 5G trial

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Day 2: Session 2 : Understanding 5G NR Call Flow

July 24th 2020, from 11:30AM - 1:00PM

Mr. Asish Jain
Application Segment Manager –Keysight

About the Speaker:
Mr. Asish Jain, M.Tech from Amity University and B.Tech from VIT, is currently working at Keysight Technologies India. He has over 11 years of experience in Aerospace & Defense, RF, µW & mmWave, Wireless and Automotive technologies. At Keysight, He has developed solutions for EMF testing, contributed to aerospace & defense turn key projects and driven country wide 5G initiatives. His areas of interest include Cellular technologies, mmWave technologies, active component characterization and test automation. He has written technical articles for various national electronics magazines and is a prominent speaker at various communication forums for RF & microwave.

Brief on the session:
The session is aimed to provide a brief overview of 5G New Radio call flow. Beginning with 5G NR technology details, vital changes in the technology will be explained. Different layers of the 5G stack will also be explained briefly to develop the background for understanding the call flow. Lastly, working of 5G call will be explained with the steps involved to establish a connection with a 5G network.

The session will be concluded with discussion on 5G in academia and research.

What you will learn:

- Overview of 5G New Radio
- Working of a 5G Call
- 5G in Academia and Research
- Complexity of technology and need for domain knowledge
- How 5G has opened up new areas of research in academia

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Day 3: Session 3: Internet of Things in the Context of 5G

July 27th 2020, from 11:30AM - 1:00PM

Dr. Vivek Bohara
Associate Professor (ECE)
IIIT Delhi

About the Speaker:
Dr. Vivek Ashok Bohara, received the Ph.D. degree from Nanyang Technological University, Singapore, in 2011. He was a Postdoctoral Researcher (Marie Curie fellowship) in ESIEE Paris, University Paris-East. In 2013, he joined IIIT-Delhi, India, where he is currently an Associate Professor. He has authored and co-authored over 50 publications in major IEEE/IET journals and refereed international conferences, two book chapters, and one patent. His research interests are towards next-generation communication technologies, such as device-to-device communication, carrier aggregation, and VLC Communications.

Brief on the session:
This course bridges the gap between the 'things' and the 'internet' aspects of IoT. Basically it covers how the smart objects can be connected to a network such as 5G. It focuses on the functionality and characteristics of the elements that will be required to build a network for IoT. Topics such as IoT wireless networks, the IoT network architecture specifically in context to 5G, and criteria for selecting a specific IoT network architecture will be discussed. Further connection technologies such as Bluetooth, ZigBee, 6LoWPAN, WLAN, IEEE 802.15.4, 802.11ah, NB-IoT, LoRa WAN, UNB, Sigfox and other LTE-A and 5G variations will also be touched upon. In addition, this module will also provide glimpse of next generation connection technologies for industrial IoT and characteristics of mMTC primarily with regards to 5G.

What you will learn:

1. Introduction to IoT
2. IoT Networks
3. Wireless Communication technologies for IoT -5G
4. Networking protocols for IoT
5. Application and use cases

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Day 4: Session 4: Li-Fi in the Context of 5G

July 29th 2020, at 11:30AM- 1:00PM

Prof. Anand Srivastava
(Dean (Innovation, R & D) and Professor (ECE) [Ex. Director & Member of CDOT Board and Adjunct Faculty, IIT Delhi]
IIIT- Delhi)

About the Speaker:
Prof. Anand Srivastava did his M.Tech. and Ph.D. from IIT Delhi. Before joining IIIT Delhi, he was Dean & Professor in School of Computing and Electrical Engineering at Indian Institute of Technology Mandi, HP, India, and also Adjunct Professor at IIT Delhi. Prior to this, he was with Alcatel-Lucent-Bell Labs, India as a solution architect for access and core networks. Before joining Alcatel Lucent, he had a long stint (20 years) with Center for Development of Telematics (CDOT), a telecom research center of Govt. of India where he was Director and member of CDOT Board.

Brief on the session:

Visible light communication (VLC) and Light Fidelity (LiFi) has gained tremendous attention recently and has become a favorable complementary technology to millimeter-wave communication in short-range communication scenarios for future 5G networks. LiFi possesses a number of prominent features to address the highly demanding 5G system requirements for high capacity, high data rate, high spectral efficiency, high energy efficiency, low battery consumption, and low latency. These prominent features include but are not limited to abundant license-free spectrum, the ability to provide multiple gigabit-per-second data rates, low energy consumption, and low implementation costs.

Market disruption potential LiFi is a disruptive technology that is poised to impact many industries. LiFi is a fundamental 5G technology. It can unlock the IoT, drive Industry 4.0 applications, light-as-a-service (LaaS) in the lighting industry, enable new intelligent transport systems, enhance road safety when there are more and more driverless cars, create new cyber-secure wireless networks, enable new ways of health monitoring of aging societies, offer new solutions to close the digital divide, and enable very high-speed wireless connectivity in future datacenters.

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