

No. 52-1/2019-Trg
Government of India
Department of Telecommunications
213, MTNL Building, Old Minto Road, New Delhi-110002
(Training & Capacity Building Division)

Dated: 17th Feb, 2021

OFFICE MEMORANDUM

Subject: "12-week Certificate Course on 5G" – Online training Course by NTIPRIT, commencing from 9th March 2021.

National Telecommunications Institute for Policy Research, Innovation & Training (NTIPRIT), Ghaziabad is inviting nominations for the above-mentioned online certificate course. Further details of the program are as under: -

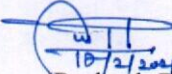
Name of the Course	Certificate Course on 5G
Duration / Dates	Commencing from 9 th March 2021 (12 weeks)
Location	Online by NTIPRIT
Eligibility	All DoT officers
Last date of registration	Wednesday, 3 rd March 2021.
Registration Link	https://tinyurl.com/yfxsqmrz

2. Brochure of the programme, is attached as Annex-I.

How to Apply:

3. After obtaining the requisite approval of competent authority kindly visit (<https://tinyurl.com/yfxsqmrz>), for Registration.

4. Alternatively, after obtaining the requisite approval of competent authority, interested officers may send the nominations directly to Sh. Suneet Kumar Tomar at suneetkumar.tomar@gov.in by the last date of registration.


(Prakash Dangi)
ADG (Training)

Copy:

Posted only on DoT website



CERTIFICATE COURSE IN 5G

Course Starting on
9th March 2021

SCAN to Register for the course
or
Visit: tinyurl.com/yfxsqmrz



LEARN 5G FOR A PROFESSIONAL EDGE

Gain a broad, technical understanding of this revolutionary technology through certification course from NTIPRIT, the premier Training Institute of Department of Telecommunications, Government of India.

In line with government's drive to promote e-learning, National Telecommunications Institute (NTIPRIT) announces first of its kind 5G certification course to train and certify Officers of Government of India. To start with, this 36-hour certificate course on 5G would be made available to Officers of Department of Telecommunications, which later on would be offered to other stakeholders.

BACKGROUND

5G networks are now a commercial reality and India is expected to have 5G services soon. This next generation of mobile technology, with features such as Enhanced Mobile Broadband, Ultra Reliable Low Latency Communication and Massive IoT, is set to radically re-shape today's mobile networks. This is why NTIPRIT has specifically developed a certification course on 5G for officers of Government of India.

The salient features of this course are:

1. Customized for Information and Communication Technology Professionals
2. 36-hour content spread over 12 weeks with 3 sessions/ week of one hour each
3. Content based on 3GPP specifications
4. Holistic coverage of technical fundamentals, deployment scenarios, use cases, QoS, Security etc.
5. Blend of sessions by NTIPRIT faculty and experts from Industry including OEMs, TSPs, market leaders, innovators etc.
6. Content delivery in online mode on MS Teams
7. One assignment every week
8. Two exams of 2 hours each-mid term and end of course with a mix of multiple choice and subjective questions
9. Re-attempt of exam allowed
10. Recorded sessions will be available on the MS Teams for further leaning by the participants



TRAINING DELIVERY

The 5G certification course will be an online Live Training within a virtual classroom environment. There will be 3 sessions per week (**every Tuesday, Wednesday and Thursday from 1530hrs to 1630hrs**), with each session of 1 hour to best suit the requirements and preferred learning style. Participants can access recorded sessions even if they miss any session.

The topics covered in this certification course would include: -

1	EVOLUTION FROM 1G TO 5G
	1G, 2G GSM, 2.5G GPRS and 2.75G EDGE
	IMT 2000: 3G UMTS, WCDMA, HSPA and HSPA+
	IMT Advanced : 4G LTE , LTE Advanced, LTE Pro
	IMT2020: Enhancements, Usage Scenarios, Technologies used in 5G
2	INTRODUCTION TO 5G
	Standardisation Bodies
	Timelines & Roadmap
	IMT 2020 Vision/ Requirement
	Spectrum for 5G
	5G New Radio
	5G Architecture
	5G Deployment Options
	5G Global Launches
	Availability of 5G Devices
	5G Use cases

3	SPECTRUM BANDS
	Spectrum Bands for Mobile Communications
	Spectrum Bands for 5G
4	5G AIR INTERFACE
	Spectrum for 5G NR
	Scalable OFDM
	5G NR Numerology
	Resource block
	Frame Structure
	Resource Grid
	Use of TDD
	BWP
	Carrier Aggregation
	5G NR Physical Channels and Signals
	SS block
	5G NR Synchronisation Procedure
	Use Cases
5	MIMO AND BEAM FORMING IN 5G NR
	Introduction to MIMO
	Beam Forming in 5G
6	5G CORE
	5G system Architecture
	Function of each Network Function of 5G core
	5G reference point Architecture
	5G Service based Architecture
	Network Function Virtualisation
	Network Slicing
	Multi Access Edge Computing (MEC)
7	QUALITY OF SERVICE IN 5G
	PDU Session and QoS Flow
	5G QoS Architecture
	Comparison with 4G
	Default QoS Flow
	GBR QoS Flow
	QoS Rule, QoS Profile and SDF Template
	QoS Flow and Network Slice
	QoS Types and parameters
	Alternate QoS Profile
	5QI Characteristics
	Standard values of 5QI
	Use Cases

8	5G NUMBERING ADDRESSING AND IDENTITIES
	UE Identities
	5G Network Identifier
	5G Core FQDN
9	DYNAMIC SPECTRUM SHARING
	Co existence of 5G NR with 4G LTE
	Use of MBSFN subframe
	Use of Other Subframe
	Case Study
10	OPEN RADIO ACCESS NETWORK (OPEN RAN) AND 5G
	Basic Concept of Traditional RAN, vRAN and Open RAN
	Centralised RAN / Cloud RAN/ BBU Hotel
	3GPP 5G NR Architecture
	CIPRI and eCIPRI
	Open RAN Groups : ORAN and TIP, SCF
	ORAN Architecture by these Groups
11	LINK BUDGET ANALYSIS FOR 5G
	Losses/ Gains in Link Budget
	Receiver Sensitivity
	Sample/Generic Link Budget
	Scenarios for Link Budget
	UMI-street canyon/ UMa/RMa/ RMI/ InF
	Antenna Modeling
	Propagation Models for Link Budget
	Link Budget Calculation
12	NETWORK FUNCTION VIRTUALISATION AND 5G
	Purpose Built Network Nodes
	Concept of Softwarisation, Virtualisation and Cloudification
13	TRANSMISSION REQUIREMENT FOR 5G
	Backhaul , Midhaul and Fronthaul for 5G
	Self Backhaul (Integrated Access and Backhaul) in 5G
14	USE CASES OF 5G IN VARIOUS SECTORS
	5G for Industry 4.0
	5G for Agriculture
	5G for other Sectors
15	LAWFUL INTERCEPTION AND MONITORING IN 5G
	DoT License Conditions related to LIS/LIM
	5G Architecture for LIS/LIM
16	5G SECURITY
	Security Enhancement in 5G
	New Challenges and its mitigation



Head of NTIPRIT
U. K. SRIVASTAVA
srdg.ntiprit-dot@gov.in



Head of Wireless Access Division
S. K. BHALLA
satinder.bhalla@gov.in



Course Director
ASHOK KUMAR
ashok.kr@gov.in



Course Coordinator
SUNEET TOMAR
suneetkumar.tomar@gov.in



Department of Telecommunications (DoT)
Ministry of Communications
Government of India

National Telecommunications Institute for Policy Research,
Innovation and Training (NTIPRIT)
NTIPRIT, Admin Building, ALT Centre
Govt of India Enclave, Near Raj Nagar, Ghaziabad-201002
ntiprit.gov.in