



भारत सरकार  
संचार मंत्रालय, दूरसंचार विभाग  
राष्ट्रीय दूरसंचार नीति शोध नवप्रवर्तन एवं प्रशिक्षण संस्थान  
अल्ट परिसर, राजनगर, गाजियाबाद (उ.प्र.) - 201002  
Government of India  
Ministry of Communications, Department of Telecommunications  
National Telecommunications Institute for Policy Research,  
Innovation & Training ALTTTC Campus, Ghaziabad (UP)-201002

### Notification

No. 1-3/2021-NTI.WA

Dated: 20.04.2022

**Subject: Invitation nominations for 3<sup>rd</sup> Batch of 6 Weeks (36 hours) online certification course in 5G for Officers of Government of India being conducted by NTIPRIT w.e.f. 17<sup>th</sup> May 2022.**

In pursuance to the objective of training and capacity building and to spread awareness about the 5G technology and its socio-technical impacts including in automation and deployment of various solutions for the benefit of the nation, National Telecommunications Institute of Policy Research, Innovation and Training (NTIPRIT) is conducting the 3<sup>rd</sup> Batch of 6 Weeks (36 hours) online certification course in 5G w.e.f. 17<sup>th</sup> May 2022 for Officers of Government of India. The structure of the 6 weeks long (36 hours) online certification course in 5G has been designed with the objective that Officers are able to understand the key policy issues, fundamental principles and technical pillars of 5G needed to engage in and contribute towards proliferation of this revolutionary technology in various sectors across India.

2. An e-brochure of this certification course is attached. Accordingly, It is requested to circulate the information about this certification course among officers of your respective Units/Divisions/LSAs/Wings and nominate a panel of 2-3 officers for this certification course. The nominated officers may register for this course at - <https://tinyurl.com/5GCertificateBatch3>

After successful registration, nominated Officers need to send a mail enclosing duly filled and submitted registration form to the undersigned at [suneetkumar.tomar@gov.in](mailto:suneetkumar.tomar@gov.in). It may be noted that the last date of registration for this certification course is 9<sup>th</sup> May 2022.

3. Any difficulty in registration or nomination may be brought to the notice of undersigned or Sh. Ashok Kumar, Director (Wireless Access), NTIPRIT - [ashok.kr100@gov.in](mailto:ashok.kr100@gov.in)

*Suneet Kumar*  
20/04/2022

(Suneet Kumar Tomar)  
ADG (Wireless Access)  
([suneetkumar.tomar@gov.in](mailto:suneetkumar.tomar@gov.in))

**Encl: As above**

To,

1. All the Heads of LSAs/Sr. DDG (TEC)/Sr. DDG (NCCS)/ All DDGs DOT HQ/Joint Wireless Advisor, Department of Telecommunications with a request to nominate officers for this certification course as per details above.

Copy for Kind Information to:

1. Sr. PPS to Member (Services)/Member (Technology)/Member (Finance), Digital Communications Commission, Sanchar Bhawan, New Delhi.
2. Sr. PPS to Director General (Telecom), Sanchar Bhawan, New Delhi.
3. Sr. PPS to Wireless Advisor, Sanchar Bhawan, New Delhi
4. PPS to Director General (NTIPRIT), Ghaziabad.
5. DDG (Training)/Director (Training) DOT HQ – with a request to upload the notification and e-brochure on DOT Website.
6. DDG (Training) NTIPRIT.
7. All Officers of NTIPRIT, Ghaziabad.

Suneet Kumar  
20/09/2022

(Suneet Kumar Tomar)  
ADG (Wireless Access)  
(suneetkumar.tomar@gov.in)



# CERTIFICATE COURSE IN 5G BATCH - 3

Course Starting on **17<sup>th</sup> May 2022**

For Registration Click: <https://tinyurl.com/5GCertificateBatch3> or SCAN



## LEARN 5G FOR A PROFESSIONAL EDGE

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

National Telecommunications Institute (NTIPRIT) announces 3rd Batch of 5G certification course to train and certify Officers of Central / State Government of India. The registration for the course is open to Officers of Government of India and Officers of State Governments of India.

## BACKGROUND

5G networks based on Non-Standalone Access are a commercial reality, and Standalone 5G access will soon follow. In India 5G trials are underway and commercial 5G will be launched 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 launched 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 6 weeks with 3 sessions/ week of two hours each
3. Blend of sessions by NTIPRIT faculty and experts from Industry including OEMs, TSPs, market leaders, innovators etc.
4. Content delivery in online mode
5. Frequent Assignments and Quizzes
6. Re-attempt of exam allowed
7. Recorded sessions for the course content to be made available



## TRAINING DELIVERY

The 5G certification course will be an online Live Training within a virtual classroom environment. There will be 3 sessions per week, with each session of 2 hours to best suit the requirements and preferred learning style. Participants can study when and where they want, on a PC, tablet or smart phone.

## THE TOPICS COVERED IN THIS CERTIFICATION COURSE WOULD INCLUDE: -

<b>1</b>	<b>EVOLUTION FROM 1G TO 5G</b>
	<ul style="list-style-type: none"> <li>▶ 1G, 2G GSM, 2.5G GPRS and 2.75G EDGE</li> <li>▶ IMT 2000: 3G UMTS, WCDMA, HSPA and HSPA+</li> <li>▶ IMT Advanced : 4G LTE , LTE Advanced, LTE Pro</li> <li>▶ IMT2020: Enhancements, Usage Scenarios, Technologies used in 5G</li> </ul>
<b>2</b>	<b>INTRODUCTION TO 5G</b>
	<ul style="list-style-type: none"> <li>▶ Standardisation Bodies</li> <li>▶ Timelines &amp; Roadmap</li> <li>▶ IMT 2020 Vision/ Requirement</li> <li>▶ Spectrum for 5G</li> <li>▶ 5G New Radio</li> <li>▶ 5G Architecture</li> <li>▶ 5G Deployment Options</li> <li>▶ 5G Global Launches</li> <li>▶ Availability of 5G Devices</li> <li>▶ 5G Use cases</li> </ul>

<b>3</b>	<b>SPECTRUM BANDS</b>
	<ul style="list-style-type: none"> <li>▶ Spectrum Bands for Mobile Communications</li> <li>▶ Spectrum Bands for 5G</li> </ul>
<b>4</b>	<b>5G AIR INTERFACE</b>
	<ul style="list-style-type: none"> <li>▶ Spectrum for 5G NR</li> <li>▶ Scalable OFDM</li> <li>▶ 5G NR Numerology</li> <li>▶ Resource block</li> <li>▶ Frame Structure</li> <li>▶ Resource Grid</li> <li>▶ Use of TDD</li> <li>▶ BWP</li> <li>▶ Carrier Aggregation</li> <li>▶ 5G NR Physical Channels and Signals</li> <li>▶ SS block</li> <li>▶ 5G NR Synchronisation Procedure</li> <li>▶ Use Cases</li> </ul>
<b>5</b>	<b>MIMO AND BEAM FORMING IN 5G NR</b>
	<ul style="list-style-type: none"> <li>▶ Introduction to MIMO</li> <li>▶ Beam Forming in 5G</li> </ul>
<b>6</b>	<b>5G CORE</b>
	<ul style="list-style-type: none"> <li>▶ 5G system Architecture</li> <li>▶ Function of each Network Function of 5G core</li> <li>▶ 5G reference point Architecture</li> <li>▶ 5G Service based Architecture</li> <li>▶ Network Function Virtualisation</li> <li>▶ Network Slicing</li> <li>▶ Multi Access Edge Computing (MEC)</li> </ul>
<b>7</b>	<b>QUALITY OF SERVICE IN 5G</b>
	<ul style="list-style-type: none"> <li>▶ PDU Session and QoS Flow</li> <li>▶ 5G QoS Architecture</li> <li>▶ Comparison with 4G</li> <li>▶ Default QoS Flow</li> <li>▶ GBR QoS Flow</li> <li>▶ QoS Rule, QoS Profile and SDF Template</li> <li>▶ QoS Flow and Network Slice</li> <li>▶ QoS Types and parameters</li> <li>▶ Alternate QoS Profile</li> <li>▶ 5QI Characteristics</li> <li>▶ Standard values of 5QI</li> <li>▶ Use Cases</li> </ul>

<b>8</b>	<b>5G NUMBERING ADDRESSING AND IDENTITIES</b>
	<ul style="list-style-type: none"> <li>▶ UE Identities</li> <li>▶ 5G Network Identifier</li> <li>▶ 5G Core FQDN</li> </ul>
<b>9</b>	<b>DYNAMIC SPECTRUM SHARING</b>
	<ul style="list-style-type: none"> <li>▶ Co existence of 5G NR with 4G LTE</li> <li>▶ Use of MBSFN subframe</li> <li>▶ Use of Other Subframe</li> <li>▶ Case Study</li> </ul>
<b>10</b>	<b>OPEN RADIO ACCESS NETWORK (OPEN RAN) AND 5G</b>
	<ul style="list-style-type: none"> <li>▶ Basic Concept of Traditional RAN, vRAN and Open RAN</li> <li>▶ Centralised RAN / Cloud RAN/ BBU Hotel</li> <li>▶ 3GPP 5G NR Architecture</li> <li>▶ CIPRI and eCIPRI</li> <li>▶ Open RAN Groups : ORAN and TIP, SCF</li> <li>▶ ORAN Architecture by these Groups</li> </ul>
<b>11</b>	<b>LINK BUDGET ANALYSIS FOR 5G</b>
	<ul style="list-style-type: none"> <li>▶ Losses/ Gains in Link Budget</li> <li>▶ Receiver Sensitivity</li> <li>▶ Sample/Generic Link Budget</li> <li>▶ Scenarios for Link Budget</li> <li>▶ UMi-street canyon/ UMa/RMa/ RMi/ InF</li> <li>▶ Antenna Modeling</li> <li>▶ Propagation Models for Link Budget</li> <li>▶ Link Budget Calculation</li> </ul>
<b>12</b>	<b>NETWORK FUNCTION VIRTUALISATION AND 5G</b>
	<ul style="list-style-type: none"> <li>▶ Purpose Built Network Nodes</li> <li>▶ Concept of Softwarisation, Virtualisation and Cloudification</li> </ul>
<b>13</b>	<b>TRANSMISSION REQUIREMENT FOR 5G</b>
	<ul style="list-style-type: none"> <li>▶ Backhaul, Midhaul and Fronthaul for 5G</li> <li>▶ Self Backhaul (Integrated Access and Backhaul) in 5G</li> </ul>
<b>14</b>	<b>USE CASES OF 5G IN VARIOUS SECTORS</b>
	<ul style="list-style-type: none"> <li>▶ 5G for Industry 4.0</li> <li>▶ 5G for Agriculture</li> <li>▶ 5G for other Sectors</li> </ul>
<b>15</b>	<b>LAWFUL INTERCEPTION AND MONITORING IN 5G</b>
	<ul style="list-style-type: none"> <li>▶ DoT License Conditions related to LIS/LIM</li> <li>▶ 5G Architecture for LIS/LIM</li> </ul>
<b>16</b>	<b>5G SECURITY</b>
	<ul style="list-style-type: none"> <li>▶ Security Enhancement in 5G</li> <li>▶ New Challenges and its mitigation</li> </ul>



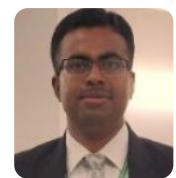
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