

## Training Course Outline

### ITU and China Academy of Information and Communications Technology

Title	5G technology development and its application
Modality	Online instructor-led
Level	Intermediate
Dates	14-27 August, 2023
Duration	14 days for course materials reading and watching with instructor-led through forum; 1 hour/day for 3-4 days live sessions (instructor-led); another 14 days till 10 September for finishing quizzes and assignment
Language	English
Region	World
Registration type	Application and selection
Registration deadline	13 August, 2023
Training fees	Free
Description	This course will help the participants to know about the general development of 5G industry globally and in China from the aspects of market, technology evolution, application scenarios etc.; the key technologies and standards progress of 5G; the application status of 5G in different vertical sectors of economy; testing technologies and its standardization and practices in the area of 5G, such as base station, massive MIMO and RF-OTA, network performance, etc.
Training topics	Wireless and fixed broadband
Certification	Certificate

Code	23OI100187MUL-E
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## 1. TARGET POPULATION

This training is targeted at managers, engineers and employees from regulators, government organisations, telecommunication companies and academia, who are interested in understanding 5G development and application. Other institutions and individuals that are interested in building their capacity related to 5G are also welcome to participate.

## 2. ENTRY REQUIREMENTS

The participants are expected to have basic knowledge of ICT, in particular mobile communication.

## 3. TRAINING OBJECTIVES

The objective is to understand the 5G industry, technologies evolution process, application scenarios and the testing issues related to 5G as well.

Upon completion of this course, participants will be able to:

- Explain the general technology, standardization, application development status relating to 5G;
- List the standardization and key technologies progress in ITU and other standard organizations;
- Explain how 5G can be applied to/in different vertical sectors of the economy;
- List the main 5G testing technologies and protocols, including base station, massive MIMO and RF-OTA, network performance, etc.

## 4. METHODOLOGY

**Course Materials:** The relevant course material will be made available on the website, which will include presentations and their video of explanation. During every week, live sessions will be held, the tutors will brief or highlight some important parts of their courses presentations.

**Online Discussion Forums:** Participants are expected to participate actively in discussion forums on selected topics throughout the week. Tutors will respond to the posts and discuss with participants

**Chat Sessions:** Online chat sessions with the tutor will take place 2-3 times during the two weeks' time. All participants are expected to join the chat sessions to interact with tutors. The specific time will be sent to participants in advance by tutors.

**Quizzes:** 2 mandatory online quizzes will be launched at the end of each week and required to submit before the announced deadline.

**Assignment:** There will be a mandatory assignment at the end of the course, which is required to submit before the announced deadline.

## 5. ASSESSMENT AND GRADING

Besides the quizzes and the assignment, participants will be evaluated according to their substantive posts on the discussion forum and other course activities, reflecting both the quantity and quality of time spent on the course. The evaluation details and criteria for certificates is as follows.

Quiz1	30%
Quiz2	30%

Individual Assignment	20%
Discussion Forum1	5%
Discussion Forum2	5%
Live and chat sessions	10%
<b>Total Evaluation:</b>	<b>100%</b>

A total score higher than 70% is required to obtain the ITU certificate.

## 6. TRAINING DETAILS & INSTRUCTIONAL APPROACH

Week	Topics covered	Key learning points (detail learning outcomes)	Training activities details
Week 1	Technology, Standardization and Testing, such as key echnologies and evolution of 5G, 5G technical features, frequency arrangement for IMT systems, and testing technologies of 5G base station, massive MIMO and RF OTA, etc.	<ol style="list-style-type: none"> <li>1. Introduction of the general development of 5G globally and in China <ul style="list-style-type: none"> <li>·The introduction will be from the aspects of market, technology evolution, and application scenarios, etc.</li> </ul> </li>   <li>2. Key technologies and evolution of 5G <ul style="list-style-type: none"> <li>·5G requirements and application scenarios</li> <li>·5G technical features and key technologies</li> <li>·5G-Advanced evolutionary requirements and key technologies</li> </ul> </li>   <li>3. IMT spectrum progress in ITU-R <ul style="list-style-type: none"> <li>·ITU-R overview</li> <li>·Frequency arrangement for IMT systems</li> </ul> </li> </ol>	<p>The participants are required to read and watch the course materials uploaded on the platform, participate live and chat zoom sessions, and interact with tutors and other participants on the forum.</p> <p>Quiz at the end of each week will be administered to learners to check their knowledge.</p> <p>Tutors will be online to respond any questions raised by participants through forum or live sessions during each week.</p>

		<p>4. The testing technology of 5G base station</p> <ul style="list-style-type: none"> <li>·Technical details about 5G base stations</li> <li>·Key standards about 5G base station testing</li> <li>·Major principles and methods for 5G base station testing</li> </ul> <p>5. Challenges on 5G Massive MIMO and RF OTA test</p> <ul style="list-style-type: none"> <li>·Massive MIMO Technical characteristics;</li> <li>·MIMO Theory</li> <li>·OTA test site</li> <li>·RF OTA test standards, such as transmitter test and receiver test</li> </ul>	
Week 2	5G Applications, such as the future trend of 5G application in China; the typical application of 5G in power and energy Industries.	<p>6. The Progress of Technology and Industrialization about 5G Vertical Industry Applications</p> <ul style="list-style-type: none"> <li>·Development Trend of 5G Vertical Industry Applications</li> <li>·5G Industry Virtual Private Network</li> <li>·5G Industry Terminals and Module</li> </ul> <p>7. Research on the development and future trend of 5G application in China</p>	<p>The participants are required to read and watch the course materials uploaded on the platform, participate live and chat zoom sessions, and interact with tutors and other participants on the forum.</p> <p>Quiz at the end of each week will be administered to learners to check their knowledge.</p> <p>Tutors will be online to respond any questions raised by participants through forum or live sessions during each week.</p>

		<ul style="list-style-type: none"> <li>·Research on the development of 5G in various vertical fields in China;</li> <li>·Analysis of the development trend of 5G application in vertical industries;</li> <li>·How 5G applications better enable the digital transformation of industries</li> </ul> <p>8. Typical Application of 5G in Key Vertical industries</p> <ul style="list-style-type: none"> <li>·Typical Application of 5G in Power Industry</li> <li>·Typical Application of 5G in Energy Industry</li> </ul> <p>9. 5G network performance test Based on user experience</p> <ul style="list-style-type: none"> <li>·General idea about network performance tests</li> <li>·Why and how to test based on user experience</li> <li>·Basic methods and tools used in the test</li> <li>·Some information and experience from practice</li> </ul>	
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## 7. TUTORS/INSTRUCTORS

Name of tutor(s)/instructor(s)	Contact details
Ms. JIAO Huiying	jiaohuiying@caict.ac.cn
Mr. YANG Bo	Yangbo3@caict.ac.cn
Mr. ZANG Jiawei	zangjiawei@caict.ac.cn
Mr. XIA Shida	xiashida@caict.ac.cn
Ms. LIU Jiawei	liujiawei@caict.ac.cn

(above list will be updated and finalized after we confirm with tutors further)

## 8. TRAINING COURSE COORDINATION

Course coordinator	ITU coordinator
Name: Ms. WANG Ying Email address: wangying@caict.ac.cn	Name: Sean Doral Email address: sean.doral@itu.int