Training Course Outline

ITU and INATEL

Title	5G Essentials
Modality	Online instructor-led
Level	Introductory
Dates	30 April – 31 December 2023
Duration	10 hours including videos, readings, forum participation, quizzes and tests.
Language	English
Region	World or Multi-Regional
Registration type	Application and selection
Registration deadline	22 December 2023
Training fees	US$ 105,00
Description	This online self-paced course provides a comprehensive overview of the 5G technology and its potential to bring social and economic growth to developing countries. Through ten videos covering topics such as enabling technologies, 5G applications, network architecture, core network, and access network, learners will gain knowledge and insights into how 5G can bridge the digital divide, improve healthcare, education, and agriculture, and enhance overall economic growth. Designed as an introductory course, this online self-paced program is suitable for individuals with varying levels of technical expertise. Its online format allows learners to study at their own pace, providing flexibility and convenience. Upon completion of the course, learners will have a good understanding of the 5G technology and its potential to drive social and economic development.

Training topics	*Wireless and fixed broadband*
Certification	*Digital badge*
Code	*23OS100190MUL-E*

1. TARGET POPULATION

This course is designed for anyone interested in gaining an understanding of 5G technology and the services that can be implemented with it. It is suitable for professionals working in the telecommunications industry, government officials, policymakers, and individuals interested in the potential of 5G technology to drive innovation, entrepreneurship, and economic growth in developing countries.

2. ENTRY REQUIREMENTS

The course is introductory in nature and does not require prior knowledge of 5G technology, making it accessible to a wide audience.

3. TRAINING OBJECTIVES

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

1. Define 5G technology and its characteristics;
2. Describe the key differences between 5G and previous wireless technologies;
3. Explain the benefits of 5G technology for developing countries;
4. Analyze the enabling technologies for 5G, including spectrum allocation, massive MIMO (multiple-input, multiple-output), and network slicing;
5. Evaluate case studies of 5G applications in healthcare, education, and agriculture;
6. Compare and contrast the network architecture of 4G and 5G;
7. Identify the functions and components of the 5G core network and access network;
8. Analyze the security challenges in 5G networks and identify possible solutions;
9. Assess the economic benefits of 5G technology for developing countries and its role in driving innovation and entrepreneurship.

3. METHODOLOGY

This course will follow a learning approach consisting of 10 pre-recorded videos with a duration of 15 to 20 minutes each and instructor moderation/interaction via the forum component of the course. The videos will be produced using the latest industry standards regarding the presentation, embedded quizzes to prevent the “fast forwarding effect” and to engage learners and reinforce key concepts.

In addition to the videos, a number of supplementary texts/articles/webpages will be provided for each video, offering learners an opportunity to deepen their understanding and explore the topics covered in more detail. The texts will be chosen to complement the video content and provide learners with additional insights and perspectives. This methodology is intended to provide a comprehensive and interactive learning experience, enabling learners to engage with the course material at their own pace and from different perspectives.

Also, A subject matter expert will monitor the course forum weekly in order to answer questions, promote relevant discussions, challenges, questions and problems, in addition to publish news on the subject. The

subject matter expert will also encourage the students to share national contexts, situations - as these would be beneficial for the other participants, encouraging social learning.

4.ASSESSMENT AND GRADING

The assessment and grading methodology include an evaluation through multiple-choice tests for each of the ten course videos, a final test and forum participation. Each test will contain five questions, each with five answer choices, with only one correct answer. The final test will contain ten questions, each with five answer choices, with only one correct answer. The questions will be designed at different levels of complexity, aiming to explore the topic covered in each video.

In order to obtain the ITU digital badge, the participant must:

1. Achieve 70% or more to each module's test AND;
2. Engage/contribute/participate with relevant treads on the course forum at least 5 times during the course AND;
3. Achieve 70% or more to final course test.

5. TRAINING DETAILS & INSTRUCTIONAL APPROACH

Module	Sessions/Topics covered	Key learning points (detail learning outcomes)	Training activities details
1	Introduction to 5G	•Definition and characteristics of 5G •Key differences between 5G and previous wireless technologies •Benefits of 5G for developing countries	•Watch a 15-20 mim. video •2 extra readings •https://www.qualcomm.com/5g/what-is-5g •https://www.forbes.com/sites/the-future-of-5g •Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
2	Enabling Technologies for 5G	•Spectrum allocation and availability •Massive MIMO and beamforming •Network slicing and virtualization	•Watch a 15-20 mim. video •1 extra reading •https://Journal of Physics: Conference Series/Key Enabling Technologies of 5G •Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
3	5G Applications for Social Development	•Case studies of 5G applications in healthcare, education and agriculture •Potential for 5G to enhance access to information and services in developing countries	•Watch a 15-20 mim. video •1 extra reading •https://weforum.org/The Impact of 5G • Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
4	5G Network Architecture	•Overview of the 5G network architecture •Differences between 4G and 5G architecture •Key features of the 5G core network and access network	•Watch a 15-20 mim. video •2 extra readings •https://www.ericsson.com/en/future-technologies/architecture •https://www.digi.com/blog/post/5g-network-architecture

			• Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
5	5G Core Network	•Functions and components of the 5G core network •Architecture and interfaces of the 5G core network	•Watch a 15-20 mim. video •1 extra reading •https://telecompedia.net/5g-core-network-overview/ •Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
6	5G Access Network	•Functions and components of the 5G access network •Architecture and interfaces of the 5G access network	•Watch a 15-20 mim. video •2 extra readings •https://www.ericsson.com/en/ran •https://nybsys.com/wireless/5g/ran/ •Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
7	5G Security and Privacy	•Security challenges in 5G networks •5G security architecture and protocols •Privacy concerns and solutions for 5G networks	•Watch a 15-20 mim. video •1 extra reading •https://europa.eu/Privacy and security aspects of 5G technology •Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
8	5G Deployment Strategies	•Deployment models for 5G networks •Challenges and opportunities for 5G deployment in developing countries •Best practices for successful 5G deployment	•Watch a 15-20 mim. video •1 extra reading •https://www.ericsson.com/5g-deployment-considerations.pdf • Take the MCQ knowledge test

			•contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
9	5G and Economic Development	•Economic benefits of 5G for developing countries •Role of 5G in bridging the digital divide and enhancing competitiveness •Potential for 5G to drive innovation and entrepreneurship in developing countries	•Watch a 15-20 mim. video •2 extra readings •https://www.pwc.com/economic-impact-5g.html •https://www.qualcomm.com/news/5g-driving-economic-growth-resiliency-and-sustainability-post-covid-economy •Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
10	5G Policy and Regulation	•Regulatory frameworks for 5G deployment and operation •Spectrum policies and licensing strategies for 5G •Government initiatives and incentives for promoting 5G in developing countries	•Watch a 15-20 mim. video •1 extra reading •https://reader.elsevier.com/reader/European Union policy on 5G •Take the MCQ knowledge test •contribute to the forum weekly challenge/problem/question which would be based on the module topic AND the extra reading
11	Final test	•The final test will include all topics covered on the videos	•Take the final MCQ knowledge test

6. TUTORS/INSTRUCTORS

Name of tutor(s)/instructor(s)	Title	Contact details
Daniel Andrade Nunes	Mr	danielnunes@inatel.br

7.TRAINING COURSE COORDINATION

Course coordinator	ITU coordinator
Title: Mr. Name: Daniel Andrade Nunes Email address: danielnunes@inatel.br	Title: Mr. Name: Carlos Lugo Silva Email address: carlos.lugo-silva@itu.int