The Abdus Salam International Centre for Theoretical Physics

Online Training Course on

5G technologies for IoT

7 – 8 June 2021

TRAINING COURSE OUTLINE

COURSE DESCRIPTION

Title	5G technologies for IoT
Objectives	After describing the basic principles of IoT and its main applications, this course aims to provide the audience with an understanding of the 5G aspects relevant to IoT and how they compare with existing proprietary technology that are currently widely deployed.
Dates	7 – 8 June 2021
Duration	2 days
Registration deadline	1 June 2021
Training fees	USD 150
Course code	21OI26448EUR-E

DESCRIPTION OF THE TRAINING COURSE

5G advantages in terms of enhanced throughout are at the forefront, but the network slicing capabilities it offers are being leveraged to meet the requirements of both massive and critical IoT applications, in which the number of devices to be served and the duration of their batteries is the most important aspect. Moreover, for certain applications, the 5G reduced latency can be a game changer. In this course we will introduce IoT and its applications, give an introduction to 5G and dive into the use of 5G in IoT. We will also cover the basic principles of spectrum regulation.

LEARNING OUTCOMES

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

- Describe the basic principles of IoT, its main applications and the currently deployed communication technologies
- Describe the electromagnetic spectrum and its regulation
- Describe the basic principles of 5G, 5G operations and main use cases
- Describe the use of 5G in IoT and the applications of AI to 5G

TARGET POPULATION

The target audience for this course is composed of Electrical Engineers, ICT/Telecommunications Engineers, Computer Scientists, Telecommunications Regulators and Network Operators. As the Abdus Salam International Centre for Theoretical Physics is a research institution, we welcome Masters and PhD students as well as young researchers.

ENTRY REQUIREMENTS

No prior knowledge or qualification in IoT or 5G is required, however it is important for participants to be working for a regulator, or in the ICT/Telecoms sector as a provider or consultant. Strongly motivated students in the Engineering, Computer Science or ICT related courses could also be considered.

TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
SUN Tan, Huawei	suntan@huawei.com
Suresh Borkar, Illinois Institute of Technology	borkar@iit.edu
Ermanno Pietrosemoli, ICTP	epietros@ictp.it

TRAINING COURSE CONTENTS

The topics covered in this course are:

1. **IoT and Introduction to 5G**
   We will give an introduction to IoT and a description of its main application fields, as well as the communication technologies with greater market traction. We will then present the Electromagnetic Spectrum to understand the need of its regulation. Then we will get acquainted with 5G starting from the 3GPP reference documents.

2. **5G**
   This topic will discuss the 5G operations and the marker introduction of this new technology. We will give a background presentation about 5G use cases, to then cover

the applications of AI to 5G. This module will furthermore present 5G and IoT and will compare 5G to other connectivity options assessing their strengths and limitations. To conclude, we will cover cyber security and reliability design.

TRAINING COURSE SCHEDULE

Session	Topic	Exercises and interactions
Day 1	**Topic 1** IoT and intro to 5G	For today's topic, each participant has to: • Read of the PPT slides uploaded in the course page for day 1 • Watch the videos that will be posted in the course page for day 1 • Actively participate in the discussion forum • Post an answer to the forum topic of the day at the latest by **Wednesday June 9th 18:00hrs (CET)** • Complete a self-test quiz by **Friday June 11th at 18:00hrs** (CET) **Day 1 Forum Topic** : In view of the definitions of IoT and 5G, what do you think should be the main areas of focus for regulators in your country ? (*your post should be at least 250 words and supported by readings from reference materials provided*)
Day 2	**Topic 2** 5G	On **day 2**, each participant has to: • Read of the PPT slides uploaded in the course page for day 1 • Watch the videos that will be posted in the course page for day 1 • Actively participate in the discussion forum • Post an answer to the forum topic of the day at the latest by **Thursday June 10th 18:00hrs (CET)** • Complete a self-test quiz by **Friday June 11th at 18:00hrs** (CET) **Day 2 Forum Topic** : Discuss how 5G technology could play a role in the growth of IoT in your country, from the technical, regulatory and economic point of view (*your post should be at least 250 words and supported by readings from reference materials provided*)

METHODOLOGY (Didactic approach)

This course will be delivered using instructor-led online learning. Each day participants must read power-point slides posted on the course page and selected reference materials, participate in scheduled activities and undertake self-assessments. Students will reinforce their understanding of the topics covered by drawing on their specific environments and are encouraged to consult with experienced colleagues who are working on a relevant topic. The following methods will be used for this course:

- Self-study of PPTs and reference materials
- Watching pre-recorded instructor led presentations
- Forum discussions

EVALUATION AND GRADING

Students performance in this course will be determined using a combination of grades for the forum and self-assessment quizzes. Where:

- Forum posts for the 2 days will be awarded 10 points in total
- Each self- assessment quiz will have 10 questions worth 1 point per question

The evaluation of the participants will be based on 80% from the average quiz marks (average score from the quizzes) and 20% from the participation with substantive posts in the discussion forums, reflecting both the quantity and the quality of time spent on the course.

Total score higher than 70% is required to obtain the ITU certificate

TRAINING COURSE COORDINATION

Course coordinator:	**ITU coordinator:**
Name: Marco Zennaro Email address: mzennaro@ictp.it	Name: Ana Maria Meshkurti Email address: ana.maria.meshkurti@itu.int

REGISTRATION AND PAYMENT

ITU Academy portal account

Registration and payment should be made online at the ITU Academy portal.
To be able to register for the course you **MUST** first create an account in the ITU Academy portal at the following address:
https://academy.itu.int/index.php/user/register

Training course registration

When you have an existing account or created a new account, you can register for the course online at the following link: https://academy.itu.int/training-courses/full-catalogue/5g-technologies-iot-1

You can also register by finding your desired course in our training catalogue https://academy.itu.int/index.php/training-courses/full-catalogue

Payment

1. **On-line payment**

A training fee of USD 150 per participant is applied for this training. Payment should be made via the online system using the link mentioned above for training registration https://academy.itu.int/training-courses/full-catalogue/5g-technologies-iot-1 .

2. **Payment by bank transfer**

Where it is not possible to make payment via the online system, select the option for offline payment to generate an invoice using the same link as above. Download the invoice to make a bank transfer to the ITU bank account shown below. Then send the proof of payment/copy of bank transfer slip and the invoice copy to Hcbmail@itu.int and copy the course coordinator. **All bank transaction fees must be borne by the payer**.

Failure to submit the above documents may result in the applicant not being registered for the training.

3. **Group payment**

Should you wish to pay for more than one participant using bank transfer and need one invoice for all of them, create an account as **Institutional Contact. Institutional Contacts** are users that represent an organization. Any student can request to be an institutional contact or to belong to any existing organization.

To do this, head to your profile page by clicking on the **"My account"** button in the user menu. At the bottom of this page you should see two buttons:

a. If you want to **become an institutional contact**, click on the "**Apply to be an Institutional Contact"** button. This will redirect you to a small form that will ask for the organization name. After you fill the name of the organization you want to represent, click on **"continue"** and a request will be created. An ITU Academy manager will manually review this request and accept or deny it accordingly.
b. If you want to **belong to an existing organization**, click on the **"Request to belong to an Institutional Contact"** button. This will redirect you to a small form that will ask you to select the organization you want to join from an organization list. After you select the correct organization, click on **"continue"**, a request will then be created. The Institutional Contact that represents that organization will manually accept or deny your request to join the organization.

ITU BANK ACCOUNT DETAILS:	
Name and Address of Bank:	UBS Switzerland AG Case postale 2600 CH 1211 Geneva 2 Switzerland
Beneficiary:	Union Internationale des Télécommunications
Account number:	240-C8108252.2 (USD)
Swift:	UBSWCHZH80A
IBAN	CH54 0024 0240 C810 8252 2
Amount:	USD 150
Payment Reference:	CoE-EUR 26448 - P.40595.1.09

4. Other method of payment

If due to national regulations, there are restrictions that do not allow for payment to be made using options 1 & 2 above, please contact the ITU coordinator for further assistance.