ITU Centres of Excellence Network for Europe

The Abdus Salam International Centre for Theoretical Physics

Online Training Course on

Applications of Satellite Based IoT Networks

14-15 December 2020

COURSE OUTLINE

Title	Applications of Satellite Based IoT Networks
Objectives	Satellite technology has an important role in driving the growth momentum behind the Internet of Things (IoT) and unlocking the promise of connected devices worldwide. Satellites serve as a key enabler for IoT applications across industries and geographical borders. In this capacity building activity, we will cover technologies of GEO (geostationary) MEO (mediumeEarth orbit), LEO (low earth orbit) and HEO (highly elliptical orbit) constellations, as well as the new developments in nanosatellites. As controlling the cost per device is of essence for the success of IoT applications, we will cover the sustainability issue of satellite based IoT applications.
Dates	14-15 December 2020
Duration	2 days
Registration deadline	13 December 2020
Training fees	USD 150
Course code	20OI24837EUR-E

LEARNING OUTCOMES

Understanding IoT requirements, tolerances and application scenarios
Understanding satellite capabilities, limitations and regulations
Understanding of small satellite technologies
Grasp of satellite constellations for IoT

TARGET POPULATION

The training course is designed for:

- Electrical engineers
- Telecommunications engineers
- Computer scientists
- Regulators
- Telecom Operators
- Networks Operators
- Managers

TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Anna Gregorio, University of Trieste	anna.gregorio@ts.infn.it
Ermanno Pietrosemoli, ICTP	ermanno@ictp.it

EVALUATION

Grading will be based on the results of multiple choice quizzes as well as the level of participation in the discussion forum using the following weights:

G = 0.3xQ1+0.3xQ2+0.4xDF

Where: Q1 – quiz 1 at the end of the first day, Q2 – quiz 2 at the end of the second day, DF – active participation in the online discussion forum.

A final grade of 70% is required to receive a successful completion certificate.

TRAINING SCHEDULE AND CONTENTS / AGENDA

Schedule and content (for online courses)

Session	Activity	Exercises and interactions
Day 1	**IoT requirements and tolerances** **(Prof.Ermanno Pietrosemoli, ICTP)** • Types of IoT solutions • Application Scenarios • Related Terminology • IoT Architecture • Main challenges	Quiz 1 (multiple choices)

	• IoT and Sustainable Development • ICT, IoT and the sustainable development goals **Satellites capabilities, limitations and regulations (Prof.Anna Gregorio, University of Trieste)** • Types of satellite orbits and their impact in power budget and latency • Inter Satellite links and number of ground stations • Satellite powering • Regulatory framework • Frequency of operation and its impact on transmission reliability • IoT specific considerations • Satellites concerns (space debris, impact on astronomical observations, etc)	
Day 2	**Small Satellites technologies (Prof.Anna Gregorio, University of Trieste)** • Introduction to small satellite technologies • Nano satellites • Pico satellites • Cube satellites • Applications of small satellite technologies to IoT **Satellite Constellations for IoT** **(Prof.Ermanno Pietrosemoli, ICTP)** • Overview of currently deployed constellations • Examples of proposed satellite constellations **Antennas for satellites, ground stations and end-devices (TBD)** • Antenna design considerations for satellites • Examples of antennas for ground stations and end-devices	Quiz 2 (multiple choices)

METHODOLOGY

The training will be instructor-led and will include videos, PowerPoint slides and multiple-choice quizzes.

COURSE COORDINATION

Course coordinator:	**ITU coordinator:**
Name: Marco Zennaro Email address: mzennaro@ictp.it	Name: Jaroslaw Ponder Email address: jaroslaw.ponder@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 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/applications-satellite-based-iot-networks

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. Payments should be made via the online system using the link mentioned above for training registration at https://academy.itu.int/training-courses/full-catalogue/applications-satellite-based-iot-networks

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 24837 – 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.