



**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**  
**COURSE OUTLINE**

**COURSE DESCRIPTION**

Title	Applications of Satellite Based IoT Networks
Objectives	<p>Satellite technologies have played a significant role in communications for many decades, since they are the only ones that can provide truly global coverage. Their applications in IoT have so far been limited, but recent advances in electronics and antenna technologies have ushered a new era of smaller satellites with improved characteristics, which coupled with improvements in launching vehicles open the door for unforeseen applications, sustainable even in budget constrained sectors.</p> <p>IoT applications can be served by both Geostationary (GEO) and Low Earth Orbit (LEO) satellites, and their relative merits will be discussed in this course, which will enable the participants to make informed choices about the best technology for a given application.</p>
Dates	November 15-16, 2021
Duration	2 days
Registration deadline	TBD
Training fees	USD 150
Course code	21OI26450EUR-E

**LEARNING OUTCOMES**

- A grasp of the basic principles of satellites and nanosatellites
- An understanding of IoT applications using GEO and LEO satellites
- An understanding of how the leading terrestrial IoT technologies can benefit from satellite services

## TARGET POPULATION

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The training course is designed for:

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

## TUTORS/INSTRUCTORS

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NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Anna Gregorio, University of Trieste	anna.gregorio@ts.infn.it
Ermanno Pietrosevoli, ICTP	ermanno@ictp.it
Federico Alimenti, University of Perugia	federico.alimenti@unipg.it

## EVALUATION

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We will evaluate presentations, practical exercises and a final exam with multiple choices for grading using the following weights:

$$G = 0.2 \times W + 0.6 \times M + 0.2 \times I$$

Where: W – presentation grade, M – written exam/multiple choice grade, I –practical exercises grade

## TRAINING SCHEDULE AND CONTENTS / AGENDA

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### Schedule and content (for online courses)

Session	Activity	Exercises and interactions
Day 1	<b>IoT requirements and tolerances</b> <b>(Prof.Ermanno Pietrosevoli, ICTP)</b> <ul style="list-style-type: none"><li>• Types of IoT solutions</li><li>• Application Scenarios</li><li>• Related Terminology</li><li>• IoT Architecture</li><li>• Main challenges</li><li>• IoT and Sustainable Development</li><li>• ICT, IoT and the sustainable development goals</li></ul>	Quiz 1 (multiple choices)

	<p><b>Satellites capabilities, limitations and regulations (Prof. Anna Gregorio, University of Trieste)</b></p> <ul style="list-style-type: none"> <li>• Types of satellite orbits and their impact in power budget and latency</li> <li>• Inter Satellite links and number of ground stations</li> <li>• Satellite powering</li> <li>• Regulatory framework</li> <li>• Frequency of operation and its impact on transmission reliability</li> <li>• IoT specific considerations</li> <li>• Satellites concerns (space debris, impact on astronomical observations, etc)</li> </ul>	
<p><b>Day 2</b></p>	<p><b>Small Satellites technologies (Prof. Anna Gregorio, University of Trieste)</b></p> <ul style="list-style-type: none"> <li>• Introduction to small satellite technologies</li> <li>• Nano satellites</li> <li>• Pico satellites</li> <li>• Cube satellites</li> <li>• Applications of small satellite technologies to IoT</li> </ul> <p><b>Satellite Constellations for IoT (Prof. Ermanno Pietrosevoli, ICTP)</b></p> <ul style="list-style-type: none"> <li>• Overview of currently deployed constellations</li> <li>• Examples of proposed satellite constellations</li> </ul> <p><b>IoT and Sustainable Development (Prof. Federico Alimenti, University of Perugia)</b></p> <ul style="list-style-type: none"> <li>• IoT and Sustainable Development</li> <li>• Green Electronics</li> <li>• ICT, IoT and the sustainable development goals</li> </ul>	<p>Quiz 2 (multiple choices)</p>

## METHODOLOGY

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

## COURSE COORDINATION

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<b>Course coordinator:</b> Name: Marco Zennaro Email address: <a href="mailto:mzennaro@ictp.it">mzennaro@ictp.it</a>	<b>ITU coordinator:</b> Name: Jaroslaw Ponder Email address: <a href="mailto:jaroslaw.ponder@itu.int">jaroslaw.ponder@itu.int</a>
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## REGISTRATION AND PAYMENT

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### 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/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/applications-satellite-based-iot-networks-0>

You can also register by finding your desired course in our training catalogue <https://academy.itu.int/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 at <https://academy.itu.int/training-courses/full-catalogue/applications-satellite-based-iot-networks-0>

#### 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](mailto: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.

**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-26450 -[WBS 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.

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