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**ITU Centres of Excellence Network for Europe**

**The Abdus Salam International Centre for Theoretical Physics**

**FACE-TO-FACE Training Course on**

**CODATA/RDA Advanced Workshop on IoT and Big-Data Analytics**

**Trieste, Italy**

**August 19-23, 2019**

**COURSE OUTLINE**

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**COURSE DESCRIPTION**

Title	CODATA/RDA Advanced Workshop on IoT and Big-Data Analytics
Objectives	The workshop first defines how IoT and why IoT data processing is very different from typical data analytics, with its unique requirements for big data and real-time processing. Using a hands-on approach with simulated data, participants will learn to build a messaging and data streaming system with Apache Spark and Kafka and perform a real-time analysis with IoT and streaming data.
Dates	August 19-23, 2019
Duration	5 days
Registration deadline	July 19, 2019
Training fees	USD 500
Course code	19WS24310EUR-E

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**LEARNING OUTCOMES**

To understand the characteristics and requirements of IoT specific and streaming data
To perform building a data flow to connect an IoT system or device data to a Big Data platform in specific formats
To perform using Big dDta tools to process IoT and streaming data in distributed computing
To use machine learning algorithms to analyze data and extract intelligence..

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**TARGET POPULATION**

The training course is designed for:

- Electrical engineers

- Telecommunications engineers
- Professionals and Scientists
- Regulators
- Telecom Operators
- Networks Operators

### TUTORS/INSTRUCTORS (preliminary)

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
E. Okereafor, Big Data Academy, USA	ekpe@okorafor.com
M. Zennaro, ICTP	mzennaro@ictp.it
Clement Onime, ICTP	<a href="mailto:onime@ictp.it">onime@ictp.it</a>

### EVALUATION

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

$$G = 0.6 \times M + 0.4 \times I$$

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

### TRAINING SCHEDULE AND CONTENTS / AGENDA

Date for 1st day	Time	Topics/Activities
08/19/2019	8:30am – 1:00pm	V Introduction to Big Data & IoT Analytics Problem Scope. Analysis of Large Scale Real-Time and Streaming Data, Kafka
	1:00pm – 2:00pm	Lunch break
	2:00pm – 5:00pm	Install & Verify Docker Environment for Kafka, Creating Topics & Passing Messages. Group Discussion on Problem
Date for 2nd day	Time	Topics/Activities
08/20/2019	8:30am – 1:00pm	Design of Kafka topics and partitions; Evaluation of the designs and suggested solutions
	1:00pm – 2:00pm	Lunch break
	2:00pm – 5:00pm	Implement Topics and Partitions for case study; Kafka: Scaling, APIs, Administration & Integration; Streaming and IoT Case Study
Date for 3rd day	Time	Topics/Activities
08/21/2019	8:30am – 1:00pm	Introduction to Spark / Spark Streaming; Real-time Data Processing Using Kafka and Spark Streaming; Setting up Spark & Integrating with Kafka
	1:00pm – 2:00pm	Lunch break
	2:00pm – 5:00pm	Real-time Data Processing Using Kafka and Spark Streaming
Date for 4th day	Time	Topics/Activities
08/22/2019	8:30am – 1:00pm	Introduction to NoSQL ; Real-time Data Pipeline (Kafka -> Spark Streaming -> Cassandra); Setting

		up Kafka - Spark streaming - Cassandra
	1:00pm – 2:00pm	Lunch break
	2:00pm – 5:00pm	Real-time Data Pipeline – writing to Cassandra;
<b>Date for 5th day</b>	<b>Time</b>	<b>Topics/Activities</b>
08/23/2019	8:30am – 1:00pm	Real-time Sentiment Analysis; Setting up Real-time Query Stack; Twitter Stream Sentiment Analysis
	1:00pm – 2:00pm	Lunch break
	2:00pm – 3:00pm	Closing ceremony

## METHODOLOGY

The course will include Instructor-led presentations, case studies, practical/hands-on exercises and assignments.

## COURSE COORDINATION

<b>Course coordinator:</b> Name: Clement Onime Email address: <a href="mailto:onime@ictp.it">onime@ictp.it</a>	<b>ITU coordinator:</b> Name: Jaroslaw Ponder, Head ITU Europe office Email address: <a href="mailto:jaroslaw.ponder@itu.int">jaroslaw.ponder@itu.int</a>
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## 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/index.php/training-courses/full-catalogue/codatarda-advanced-workshop-iot-and-big-data-analytics>.

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 500 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/index.php/training-courses/full-catalogue/codatarda-advanced-workshop-iot-and-big-data-analytics>.

#### 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.
- 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 500
Payment Reference:	CoE-EUR 24310-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.

## CERTIFICATES

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Each fully registered participant who will successfully complete the course, based on the evaluation, will receive an ITU Certificate after the course.