**ITU Centres of Excellence Network for Europe Region**

**A.S. Popov Odessa National Academy of Telecommunications (ONAT)**

**Blended Training Course on**

**Features of 5G technology implementation at the local
(some towns), regional (district, region) and national level**

**Odessa, Ukraine**
**23-24 May 2019**

## COURSE OUTLINE

## COURSE DESCRIPTION

| | |
|---|---|
| Title | Features of 5G technology implementation at the local (some towns), regional (district, region) and national level |
| Objectives | The purpose of the Workshop is to give to the participants the information on modern and perspective technologies for mobile communications and broadband access. The Workshop will allow participants in future personally to assist introduction and development of 5G mobile communication and broadband access networks. |
| Dates | 23-24 May 2019 |
| Duration | 2 days |
| Registration deadline | 23 May 2019 |
| Training fees | USD 150 |
| Course code | 19BD24331EUR-E |

## LEARNING OUTCOMES

Upon completion of this training, participants will have understanding of:
- 4G/4.5G/5G Technologies, its use cases and application;
- 4G/4.5G/5G Link and Physical layers and the bricks to extra-efficiency;
- The evolution of mobile communication systems and the development of the IMT-Advanced radio interface and transition to IMT-2020;
- The new approaches to manage the use of radio frequency resources in 5G/IMT-2020 networks;
- The structure of the 5G radio access network;
- Superdense 5G radio access networks  (M2M networks);
- MIMO- technology in the 5G radio access network;

- The expected economic effect from the introduction of 5G wireless access networks.

## TARGET POPULATION

The course is targeted at technical staff, engineers, senior and mid-level management staff of telecommunications service providers, telecommunication and broadcasting companies. It is also of interest to employees of Telecommunication Authorities dealing with the issues of broadband network development, audio and multimedia broadcasting.

## TUTORS/INSTRUCTORS

| NAME OF TUTOR(S)/INSTRUCTOR(S) | CONTACT DETAILS |
|---|---|
| Mr. Vadim Kaptur<br>Vice-rector for Scientific Work, PhD<br>A.S. Popov Odessa National Academy of Telecommunications | Email: vadim.kaptur@onat.edu.ua |
| Mr. Mikhail Rozhnovskiy<br>Head of Department of Technical Electrodynamics and Radio Communication Systems, PhD<br>A.S. Popov Odessa National Academy of Telecommunications | Email: kaf.ted_srs@onat.edu.ua |
| Mr. Dmitry Makoveenko<br>Chief of Radio frequencies department of SE UNIIRT, associate professor of Department of Television and Radio Broadcasting, PhD<br>A.S. Popov Odessa National Academy of Telecommunications | Email: dikatama.dm@gmail.com |
| Mr. Vladimir Baliar<br>Associate professor of Department of Television and Radio Broadcasting, PhD<br>A.S. Popov Odessa National Academy of Telecommunications | Email: balyar.vb@onat.edu.ua |

## EVALUATION

Besides the final assignment score, participants will be evaluated according to their substantive posts on the discussion forum, active participation in sessions and other course activities, reflecting both the quantity and quality of time spent on the training.

## TRAINING SCHEDULE AND CONTENTS / AGENDA

**Agenda (for face-to-face courses)**

| Date for 1st day | Time | Topics/Activities |
|---|---|---|
| 05/24/2019 | 8:30 – 09:30 | Participant registration |
| | 9:30 – 10:00 | Opening remarks |
| | 10:00 – 11:00 | Lecture 1: 4G/4.5G/5G Technologies: use cases and application |
| | 11:00 – 11:30 | Coffee break |

| | 11:30-12:30 | Lecture 2: 4G/4.5G/5G Link and Physical layers: bricks to extra-efficiency |
|---|---|---|
| | 12:30 – 14:00 | Lunch break |
| | 14:00 – 15:30 | Lecture 3: The evolution of mobile communication systems. Development of the IMT-Advanced radio interface and transition to IMT-2020 |
| | 15:30 – 16:00 | Coffee  break |
| | 16:00 – 17:00 | Lecture 4: The new approaches to manage the use of radio frequency resources in 5G/IMT-2020 networks *Quizz* |
| **Date for 2nd day** | **Time** | **Topics/Activities** |
| 05/25/2019 | 9:00 – 10:00 | Lecture 5: The structure of the 5G radio access network |
| | 10:00 – 10:30 | Coffee break |
| | 10:30 – 11:30 | Lecture 6: Superdense 5G radio access networks  (M2M networks) |
| | 11:30-12:30 | Lecture 7: MIMO- technology in the 5G radio access network |
| | 12:30 – 14:00 | Lunch break |
| | 14:00 – 15:30 | Lecture 8: The expected economic effect from the introduction of 5G wireless access networks *Final Test* |
| | 15:30 – 16:00 | Coffee  break |
| | 16:00 – 17:00 | Summing up the Workshop. Closing |

## METHODOLOGY

The training will include Instructor-led presentations, case studies, group exercises and assignments.

All announcements for all events (materials, quizzes and forums) will be given several days prior to the event by the training tutor.

## COURSE COORDINATION

| **Course coordinator:** | **ITU coordinator:** |
|---|---|
| Name: *Mr. Vladyslav Kumysh* Email address: rdd@onat.edu.ua | Name: *Mr. Jaroslaw Ponder* Email address: EURegion@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/index.php/training-courses/full-catalogue/features-5g-technology-implementation-local-some-towns-regional-district-region-and-national-level

You can also register by finding your desired course in our training catalogue at 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/index.php/training-courses/full-catalogue/features-5g-technology-implementation-local-some-towns-regional-district-region-and-national-level.

### 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:**

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|---|---|
| Name and Address of Bank: | UBS Switzerland AG<br>Case postale 2600<br>CH 1211 Geneva 2<br>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 24331- P.40595.1.10 |

### 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.