



## ITU Centres of Excellence Network for Arab Region

### Smart Tunisian Technoparks (S2T)

#### Online Training Course on “5G Mobile Networks and Systems” 14-20 September 2020

### COURSE OUTLINE

#### COURSE DESCRIPTION

Title	5G Mobile Networks and Systems
Objectives	The fifth mobile radio generation 5G is expected to be launched in 2020 in many countries in the world. Many new technologies are now part of the future generation in order to cope with the new requirements. This course aims at presenting the evolution of mobile radio generations toward 5G and examining the fundamentals of 5G. It gives the new requirements and KPI of 5G systems. It also highlights the new air interface, new technologies and architecture of 5G systems and gives the standardization advances of these systems.
Dates	14-20 September 2020
Duration	7 Days
Registration deadline	4 September
Training fees	150 USD
Course code	20OI24934ARB-E

#### LEARNING OUTCOMES

This training aims at providing all participants with extensive insights on “4G/5G systems”.

The main purpose of this training is to learn more about:

- ✓ the limitation of the 4G system and its evolution toward 5G;
- ✓ the new requirements of 5G systems;
- ✓ the new technologies, features and architecture of the upcoming 5G systems especially: frequency bands, 5G NR, the new air interface NOMA, Cloud-RAN, Network Slicing, D2D communications, Small Cell Networks;

- ✓ the migration from 4G to 5G systems and deployment of 5G in the world;
- ✓ the evolution and timeline of 3GPP specifications.

## TARGET POPULATION

---

This training targets engineers and technical staff from 4G/5G systems, regulators, policy makers, telecom operators, industry, and academia. Other institutions and individuals who are interested in building their capacity in 5G systems are also welcome to participate in this training program.

## TUTORS/INSTRUCTORS

---

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
<p><b>Soumaya Hamouda</b> is an engineer, Associate Professor at the Faculty of Science of Bizerte, and a researcher at Sup'Com (Higher School of Communication of Tunis)</p> <p>Dr. Soumaya Hamouda is delivering seminars in wide variety of subjects related to wireless networks at an international level with ITU (International Telecommunication Union).</p>	<p><a href="mailto:Soumaya.hamouda@supcom.tn">Soumaya.hamouda@supcom.tn</a></p>

## EVALUATION

---

The assessment of the participants shall be based on the attendance and a final test. The latter will be based on QCM and Short Questions on the different parts of the course.

## TRAINING SCHEDULE AND CONTENTS / AGENDA

---

Date for 1 <sup>st</sup> day	Time; Start time	Topics/Activities
<b>14/09/2020</b>	19:00 - 20:00 (online meeting from 7:00 to 8:00 pm Tunisia time)	Evolution of radio-mobile systems toward 5G <ul style="list-style-type: none"> <li>• Standardization evolution</li> <li>• Technological limitation</li> <li>• Market trends</li> </ul> 4G summary features <ul style="list-style-type: none"> <li>• LTE-A architecture, air interface and technologies</li> <li>• LTE-A Global deployment</li> </ul>
Date for 2 <sup>nd</sup> day	Time; Start time	Topics/Activities
<b>15/09/2020</b>	19:00 - 20:00 (online meeting from 7:00 to 8:00 pm Tunisia time)	Toward 5G <ul style="list-style-type: none"> <li>• Service and market trends</li> <li>• New requirements</li> <li>• KPI of 5G systems</li> </ul> 5G specifications <ul style="list-style-type: none"> <li>• 3GPP Releases and timeline</li> </ul>

Date for 3 <sup>rd</sup> day	Time; Start time	Topics/Activities
16/09/2020	19:00 - 20:00 (online meeting from 7:00 to 8:00 pm Tunisia time)	5G NR features <ul style="list-style-type: none"> <li>• Frequency bands</li> <li>• Deployment in the world</li> </ul> 5G NR New air interface <ul style="list-style-type: none"> <li>• Massive MIMO and beamforming</li> <li>• NOMA</li> <li>• OFDM frame and numerology</li> </ul>
Date for 4 <sup>th</sup> day	Time; Start time	Topics/Activities
17/09/2020	19:00 - 20:00 (online meeting from 7:00 to 8:00 pm Tunisia time)	5G NR New air interface <ul style="list-style-type: none"> <li>• Millimeter waves</li> <li>• Full duplex</li> </ul> 5G NR deployment modes <ul style="list-style-type: none"> <li>• NSA and SA</li> </ul>
Date for 5 <sup>th</sup> day	Time; Start time	Topics/Activities
18/09/2020	19:00 - 20:00 (online meeting from 7:00 to 8:00 pm Tunisia time)	5G RAN architecture <ul style="list-style-type: none"> <li>• 5G Cloud-RAN and virtualization</li> <li>• Integration of UAV</li> </ul>
Date for 6 <sup>th</sup> day	Time; Start time	Topics/Activities
19/09/2020	19:00 - 20:00 (online meeting from 7:00 to 8:00 pm Tunisia time)	5G RAN architecture <ul style="list-style-type: none"> <li>• Ultra-dense Small Cell Networks</li> </ul> 5G CORE architecture <ul style="list-style-type: none"> <li>• Network Slicing</li> </ul>
Date for 7 <sup>th</sup> day	Time; Start time	Topics/Activities
20/09/2020	19:00 - 20:00 (online meeting from 7:00 to 8:00 pm Tunisia time)	5G and IoT <ul style="list-style-type: none"> <li>• 5G D2D/M2M/5G IoT communications</li> <li>• NB-IoT and eMTC</li> <li>• Other applications: LTE-V, V2X</li> </ul>
		<b>Test Evaluation</b>

## METHODOLOGY

The online program will include Instructor-led presentations, Case Studies, Group Exercises, and Quizzes.

## COURSE COORDINATION

---

<b><u>Training Coordinator:</u></b>  <b>Mrs. Houda Jarraya</b> Focal point at S2T Tel: + 216 71 856 073 Mobile: +216 97 879 228 / 28 300 878 Fax: +216 71 857 803 Email : <a href="mailto:houda.jarraya@s2t.tn">houda.jarraya@s2t.tn</a> <a href="mailto:houda.jarraya@gmail.com">houda.jarraya@gmail.com</a>	<b><u>ITU Coordinator:</u></b>  <b>Eng. Mustafa Al Mahdi</b> Programme Officer Arab Regional Office-ITU Tel: +202 3537 1777 Mobile: +20114 117 75 73 Fax : +202 3537 1888 Email : <a href="mailto:mustafa-ahmed.al-mahdi@itu.int">mustafa-ahmed.al-mahdi@itu.int</a>
---	--

## 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/5g-mobile-networks-and-systems>. 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/5g-mobile-networks-and-systems>

#### 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

**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-ARB 24934 - WBS No. P.40592.1.03

### 4. Other method of payment

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