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

**Smart Tunisian Technoparks (S2T)**

**Online Training Course on**

**IMT-2000/5G Mobile Networks and Systems**

**15-21 March 2021**

**TRAINING COURSE OUTLINE**

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**COURSE DESCRIPTION**

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Title	IMT-2000/5G Mobile Networks and Systems
Objectives	This training aims at providing all participants with extensive insights on IMT-2000/5G Mobile Networks and Systems.
Dates	15-21 March 2021
Duration	7 Days
Registration deadline	05 March 2021
Training fees	150 USD
Course code	21O126422ARB-E

**DESCRIPTION OF THE TRAINING COURSE**

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This training will focus on the understanding of the basic concepts IMT-2000/5G Mobile Networks and Systems.

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

## LEARNING OUTCOMES

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This training aims at providing all participants with extensive insights on IMT-2000/5G Mobile Networks and Systems.

By the end of this training, the participants should be able to understand:

- ✓ The limitation of the IMT-2000/5G system and its evolution toward 5G.
- ✓ The new requirements of IMT-2000/5G systems.
- ✓ The new technologies, features and architecture of the upcoming 5G systems especially: frequency bands, IMT-2000/5G NR, the new air interface NOMA, Cloud-RAN, Network Slicing, D2D communications, Small Cell Networks.
- ✓ The migration from 4G to IMT-2000/5G systems and deployment of 5G in the world.
- ✓ The evolution and timeline of 3GPP specifications.

## TARGET POPULATION

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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 welcomed to participate in this training program.

## ENTRY REQUIREMENTS

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2G/3G mobile radio networks fundamentals.

## TUTORS/INSTRUCTORS

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NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
<p>Dr. Soumaya Hamouda 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>She 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>



## TRAINING COURSE CONTENTS

Evolution of radio-mobile systems toward 5G

Toward 5G

5G NR features

5G NR New air interface

5G RAN architecture

5G and IoT

## TRAINING COURSE SCHEDULE (Tunis Time)

Week / Session	Time; Start time	Topic	Exercises and interactions
<b>Day 1</b> <b>15/03/2021</b>	09:00 - 12:00	Evolution of radio-mobile systems toward 5G  •Standardization evolution  •Technological limitation  •Market trends  4G summary features  •LTE-A architecture, air interface and technologies  •LTE-A Global deployment	A forum will be activated in order to interact with the participants (17:00-18:00)
			Quiz1 (14:00-16:00)
<b>Day 2</b> <b>16/03/2021</b>	09:00 - 12:00	Toward 5G  •Service and market trends  •New requirements  •KPI of 5G systems  5G specifications  •3GPP Releases and timeline	A forum will be activated in order to interact with the participants (17:00-18:00)
			Quiz2 (14:00-16:00)

<b>Day 3</b> <b>17/03/2021</b>	09:00 - 12:00	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 beam forming</li> <li>•NOMA</li> <li>•OFDM frame and numerology</li> </ul>	A forum will be activated in order to interact with the participants (17:00-18:00)
			Quiz3 (14:00-16:00)
<b>Day 4</b> <b>18/03/2021</b>	09:00 - 12:00	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>	A forum will be activated in order to interact with the participants (17:00-18:00)
			Quiz4 (14:00-16:00)
<b>Day 5</b> <b>19/03/2021</b>	09:00 - 12:00	5G RAN architecture <ul style="list-style-type: none"> <li>•5G Cloud-RAN and virtualization</li> <li>•Ultra-dense Small Cell Networks</li> </ul>	A forum will be activated in order to interact with the participants(17:00-18:00)
			Quiz5 (14:00-16:00)
<b>Day 6</b> <b>20/03/2021</b>	09:00 - 12:00	5G CORE architecture <ul style="list-style-type: none"> <li>• SDN, NFV</li> <li>• Network Slicing</li> </ul>	A forum will be activated in order to interact with the participants (17:00-18:00)
			Quiz6 (14:00-16:00)
<b>Day 7</b> <b>21/03/2021</b>	09:00 - 12:00	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> Evaluation	Final evaluation (Open the whole day)

## METHODOLOGY (Didactic approach)

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Course materials: Each module will be available for the course material on the website  
Online Discussion Forums: Participants are expected to participate actively in discussion forums on selected topics throughout the week.

## EVALUATION AND GRADING

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Evaluation will be based on quizzes every day and a final exam.  
Grading will take into consideration attendance (30%) and a final overall exam (70%).

**IMPORTANT:** a passing mark of 60% is required for obtaining a completion certificate

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## TRAINING COURSE COORDINATION

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<b>Course coordinator:</b> Mrs. Houda Jarraya Focal point at S2T Tel: + 216 71 856 073 Mobile: +216 97 879 228 / 28 300 878 Fax: +216 71 857 803 Email address: <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>ITU coordinator:</b> Eng. Mustafa Al Mahdi Programme Officer Arab Regional Office-ITU Tel: +202 3537 1777 Mobile: +20114 117 75 73 Fax : +202 3537 1888 Email address : <a href="mailto:mustafa-ahmed.al-mahdi@itu.int">mustafa-ahmed.al-mahdi@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 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/index.php/training-courses/full-catalogue/jmt-20005g-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. Payment 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/imt-20005g-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

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-ARB 26422 - WBS No. P.40592.1.03

**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.