



## Training Course Outline

### ITU and National Institute of Telecommunications

Title	Technical, business and regulatory aspects of 5G network
Modality	Online instructor-led
Dates	22-29 August 2022
Duration	8 days
Registration deadline	21 August 2022
Training fees	USD 150
Description	<p>This course will focus on technical, business and regulatory aspects of the 5G mobile networks. It include will 4G mobile technology transition toward the 5G, considering the access and core networks as well as end-user services. Mobile broadband Internet after 4G will continue with the next generation, 5G, so the course will cover also IPv6 and its impact on 5G mobile networks. Further, it will include M2M (Machine-to-Machine) and mobile Internet of Things (IoT) services are foreseen types in future 5G mobile environments, as well as mobile cloud computing implementations. Also, the course will include spectrum management for IMT (International Mobile Telecommunications) including the 5G considerations. The QoS in mobile networks going from 3G/4G mobile world toward the 5G will continue to be important, hence the course will also focus on QoS and QoE in next generation mobile environments. Finally, the course will focus on emerging services and applications in 5G mobile networks in different verticals, including technology, as well as their business and regulation aspects.</p>
Course code	22OI27809EUR-E

## 1. LEARNING OBJECTIVES

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This course will focus on technical, business and regulatory aspects of the 5G mobile networks. It include will 4G mobile technology transition toward the 5G, considering the access and core networks as well as end-user services. Mobile broadband Internet after 4G will continue with the next generation, 5G, so the course will cover also IPv6 and its impact on 5G mobile networks. Further, it will include M2M (Machine-to-Machine) and mobile Internet of Things (IoT) services are foreseen types in future 5G mobile environments, as well as mobile cloud computing implementations. Also, the course will include spectrum management for IMT (International Mobile Telecommunications) including the 5G considerations. The QoS in mobile networks going from 3G/4G mobile world toward the 5G will continue to be important, hence the course will also focus on QoS and QoE in next generation mobile environments. Finally, the course will focus on emerging services and applications in 5G mobile networks in different verticals, including technology, as well as their business and regulation aspects.

## 2. LEARNING OUTCOMES

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At the end of the training, the participant should have gained an understanding of the key aspects of:

- Mobile broadband evolution
- LTE-Advanced-Pro: transition from 4G toward 5G mobile networks
- 5G network architecture: network slicing
- 5G New Radio access
- 5G Next Generation core network
- 5G services: mobile ultra-broadband and ultra-reliable low latency services
- Massive Internet of Things (IoT) and IPv6 in 5G
- 5G Quality of Service (QoS)
- Business aspects of 5G networks and services
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- 5G/IMT spectrum management and regulation

## 3. TARGET POPULATION

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This course is targeted at managers, engineers and employees from regulators, government organisations, telecommunication companies and academia, who are interested in understanding, implementation and regulation of technical, business and regulatory aspects of 5G network, including technologies, standardization, regulation and content. Other institutions and individuals that are dedicated in building their capacity related to technical, business and regulatory aspects of 5G network are also welcome to participate.

## 4. ENTRY REQUIREMENTS

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No prior knowledge or qualification is required to register for this course, considering the given target population.

## 5. TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Prof. Toni Janevski	<a href="mailto:tonij@feit.ukim.edu.mk">tonij@feit.ukim.edu.mk</a>

## 6. TRAINING COURSE CONTENTS

There are in total eight days, from which first 5 days (22-26 August 2022) there will be given recorded video lectures, 2 per day, five days in total and that gives the total of 10 video lectures in this course. The lectures are on the following subjects:

Lecture	Subject
Lecture 1	Mobile broadband evolution
Lecture 2	LTE-Advanced-Pro: transition from 4G toward 5G mobile networks
Lecture 3	5G network architecture: network slicing
Lecture 4	5G New Radio Access
Lecture 5	5G Next Generation Core Network
Lecture 6	5G services: mobile ultra-broadband and ultra-reliable low latency services
Lecture 7	Massive Internet of Things (IoT) and IPv6 in 5G
Lecture 8	5G Quality of Service (QoS)
Lecture 9	Business aspects of 5G networks and services
Lecture 10	5G/IMT spectrum management and regulation

## 7. TRAINING COURSE SCHEDULE

Days	Topic	Exercises and interactions
Day 1	Lecture 1. Mobile broadband evolution Lecture 2. LTE-Advanced-Pro: transition from 4G toward 5G mobile networks	Watching and listening to video lectures 1 and 2. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
Day 2	Lecture 3. 5G network architecture: network slicing Lecture 4. 5G New Radio Access	Watching and listening to video lectures 3 and 4. Answering on questions asked by the tutor, and

		possibility to ask questions to him via course forum.
<b>Day 3</b>	Lecture 5. 5G Next Generation Core Network Lecture 6. 5G services: mobile ultra-broadband and ultra-reliable low latency services	Watching and listening to video lectures 5 and 6. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
<b>Day 4</b>	Lecture 7. Massive Internet of Things (IoT) and IPv6 in 5G Lecture 8. 5G Quality of Service (QoS)	Watching and listening to video lectures 7 and 8. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
<b>Day 5</b>	Lecture 9. Business aspects of 5G networks and services Lecture 10. 5G/IMT spectrum management and regulation	Watching and listening to video lectures 9 and 10. Answering on questions asked by the tutor, and possibility to ask questions to him via course forum.
<b>Day 6-7</b>	Consolidation of knowledge	Possibility to watch all video lectures one again with possibility to ask questions to the tutor.
<b>Day 8</b>	Final Quiz	Solving the Final Quiz.

## 8. METHODOLOGY (Didactic approach)

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The course methodology will be as follows:

- Each day from 22 to 26 August 2022 there will be made available two recorded video lectures, which are recorded in the face-to-face ITU Centre of Excellence workshop organised by National Institute of Telecommunications in Poland. In total there are 10 video lectures during the course.
- Discussion forum will be organized based on discussion topics given on a daily basis, where students are highly encouraged to participate and interact with instructors and other students.
- Quiz test will be assigned on the last day of the course, 29 August 2022.
- All announcements for all events (lectures, quiz and forum) will be given in a timely manner (prior to the event) by the course tutor.

## 9. EVALUATION AND GRADING

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On the last day of the course a quiz test will be assigned. It will consist of 20 questions (multiple choice) which should be solved in a time frame of 90 minutes, with at least 12 correct answers (60%).

The course evaluation for obtaining the certificate at the end is based primarily on the results from the Quiz, however, replies to the raised discussion topics may also be considered in the evaluation process.

## 10. TRAINING COURSE COORDINATION

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<b>Course coordinator:</b> Name: Sylwester Laskowski Email address: <a href="mailto:S.Laskowski@il-pib.pl">S.Laskowski@il-pib.pl</a>	<b>ITU coordinator:</b> Name: Jaroslaw Ponder Email address:
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