National Institute of Telecommunications

Online Training Course on

QoS Technologies and Regulation for Fixed and Mobile

27 September – 4 October 2021

TRAINING COURSE OUTLINE

COURSE DESCRIPTION

Title	QoS Technologies and Regulation for Fixed and Mobile
Objectives	This course will focus on technical, business and regulatory aspects of QoS for Fixed and Mobile Networks. It includes QoS (Quality of Service) and QoE (Quality of Experience) fundamentals by ITU, as well as traffic and QoS management in Internet and IP networks. Further, it includes QoS for fixed ultra-broadband access, including QoS solutions in metallic and optical networks, carrier grade Ethernet QoS, as well as end-to-end QoS. The course also covers QoS for mobile ultra-broadband access, including 4G and 5G mobile technologies and their QoS capabilities and approaches. Further, it covers QoS-enabled services provisioning, including QoS and QoE for VoIP, video and IPTV services, as well as QoS for Internet OTT/data services. The course includes interconnection and its QoS aspects, generic and specific QoS parameters, KPIs (Key Performance Indicators) and their measurements, as well as network neutrality approach for OTT/data services and its regulation. The QoS constantly increases in its importance with the digitization and innovation of various critical services, so the course includes QoS regulatory framework based on technical, business/economic and regulatory principles of QoS for services over fixed and mobile networks.
Dates	27 September – 4 October 2021
Duration	8 days
Registration deadline	27 September 2021
Training fees	USD
Course code	21OI26415EUR-E

DESCRIPTION OF THE TRAINING COURSE

This course will focus on technical, business and regulatory aspects of QoS for Fixed and Mobile Networks. It includes QoS (Quality of Service) and QoE (Quality of Experience) fundamentals by ITU, as well as traffic and QoS management in Internet and IP networks. Further, it includes QoS for fixed ultra-broadband access, including QoS solutions in metallic and optical networks, carrier grade Ethernet QoS, as well as end-to-end QoS. The course also covers QoS for mobile ultra-broadband access, including 4G and 5G mobile technologies and their QoS capabilities and approaches. Further, it covers QoS-enabled services provisioning, including QoS and QoE for VoIP, video and IPTV services, as well as QoS for Internet OTT/data services. The course includes interconnection and its QoS aspects, generic and specific QoS parameters, KPIs (Key Performance Indicators) and their measurements, as well as network neutrality approach for OTT/data services and its regulation. The QoS constantly increases in its importance with the digitization and innovation of various critical services, so the course includes QoS regulatory framework based on technical, business/economic and regulatory principles of QoS for services over fixed and mobile networks.

LEARNING OUTCOMES

At the end of the training, the participant should have gained an understanding of the key aspects of:
- QoS and QoE fundamentals by ITU
- Traffic and QoS management
- QoS for fixed ultra-broadband
- QoS for mobile ultra-broadband
- QoS and QoE for VoIP and IPTV
- QoS for Internet data services
- Interconnection and QoS
- QoS parameters, KPIs and measurements
- Network neutrality regulation
- QoS regulatory framework

TARGET POPULATION

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 QoS for Fixed and Mobile networks, including technologies, standardization, and regulation. Other institutions and individuals that are dedicated in building their capacity related to QoS Technologies and Regulation for Fixed and Mobile Networks are also welcome to participate.

ENTRY REQUIREMENTS

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

TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Prof. Toni Janevski	tonij@feit.ukim.edu.mk

TRAINING COURSE CONTENTS

There are in total eight days, from which first 5 days (27 September – 1 October) 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	QoS and QoE fundamentals by ITU
Lecture 2	Traffic and QoS management
Lecture 3	QoS for fixed ultra-broadband
Lecture 4	QoS for mobile ultra-broadband
Lecture 5	QoS and QoE for VoIP and IPTV
Lecture 6	QoS for Internet data services
Lecture 7	Interconnection and QoS
Lecture 8	QoS parameters, KPIs and measurements
Lecture 9	Network neutrality regulation
Lecture 10	QoS regulatory framework

TRAINING COURSE SCHEDULE

Days	Activity	Exercises and interactions
Day 1	Learning	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	Learning	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.
Day 3	Learning	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.
Day 4	Learning	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.
Day 5	Learning	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.
Day 6-7	Consolidation of knowledge	Possibility to watch all video lectures one again with possibility to ask questions to the tutor.
Day 8	Solving the Final Quiz	Solving the Final Quiz.

METHODOLOGY (Didactic approach)

The course methodology will be as follows:

- Each day from 27 September to 1 October 2021 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, 4 October 2021.
- All announcements for all events (lectures, quiz and forum) will be given in a timely manner (prior to the event) by the course tutor.

EVALUATION AND GRADING

On the last day of the course a quiz test will be assigned. It will consist of 20 questions (multiple choice) witch 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.

TRAINING COURSE COORDINATION

Course coordinator:	ITU coordinator:
Name: Sylwester Laskowski Email address: S.Laskowski@il-pib.pl	Name: Ana-Maria Meshkurti Email address: ana.maria.meshkurti@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 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/training-courses/full-catalogue/qos-technologies-and-regulation-fixed-and-mobile-1

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 https://academy.itu.int/training-courses/full-catalogue/qos-technologies-and-regulation-fixed-and-mobile-1 .

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:	
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-EUR 26415 - P.40595.1.04

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

Each fully registered participant who successfully completes the course, based on the evaluation, will receive an ITU Certificate for this course.