



ITU Centres of Excellence Network for Europe

Faculty of Electrical Engineering and Information Technologies in Skopje

Online Training Course on
Future Broadband Internet, Cloud Computing and Internet of Things

26 May – 22 June 2020

COURSE OUTLINE

COURSE DESCRIPTION

Title	Future Broadband Internet, Cloud Computing and Internet of Things
Objectives	This course will focus on Future Broadband Internet, Cloud Computing and Internet of Things, including technologies, regulation and business aspects. It will cover Internet technologies, including IPv6, migration from IPv4 to IPv6, DNS, DHCP, Internet networking, HTTP 2.0, IP interconnection, IP QoS, cybersecurity, as well as Internet governance. Also, the course will include MPLS/IP transport, VPNs, Carrier Ethernet, as well as future gigabit copper, fiber optic, submarine cable, and satellite broadband access. Further, it will cover Software Defined Networking (SDN) and network virtualization (NFV) for fixed and mobile access and core, ITU's Cloud Computing architectures and models (SaaS, PaaS, IaaS), cloud security and privacy, OTT and telecom clouds, edge and fog computing services, as well as clouds governance. It will also include Internet of Things (IoT) and Web of Things (WoT), including critical IoT and massive IoT, data management, Big Data architectures, Big Data-driven networking, as well as IoT/data security, privacy and trust. The course will also include use of Artificial Intelligence (AI) for Internet and telecoms. Finally, it will cover future broadband OTT services (video, social, AR/VR, Web 3.0) and net neutrality, future IPTV, Industry 4.0, smart city, future clouds, future IoT/Big-Data/AI services, including their business and regulatory aspects.
Dates	26 May – 22 June 2020
Duration	4 weeks
Registration deadline	25 May 2020
Training fees	USD 150
Course code	200I24822EUR-E

LEARNING OUTCOMES

Upon completion of this course, participants will be able to:

- Understand Internet technologies, including IPv6, migration from IPv4 to IPv6, DNS, DHCP, Internet networking, HTTP 2.0, IP interconnection, IP QoS, cybersecurity, as well as Internet governance;
- Understand future broadband access, submarine cable and satellite broadband access, SDN, and Cloud Computing;
- Perform technical, business and regulatory analysis for future broadband access, SDN, NFV and cloud computing;
- Understand Internet of Things (IoT), Big Data, and Artificial Intelligence (AI) and their interrelations;
- Understand future telecom services, IoT/BigData/AI services, future Over-The-Top (OTT) services, as well as relation between Internet network neutrality and QoS in telecom networks;
- Perform technical, business and regulation analysis of future telecom, IoT/BigData/AI and Over-The-Top (OTT) services.

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 Future Broadband Internet, Cloud Computing and Internet of Things, including technologies, standardization, regulation and content. Other institutions and individuals that are dedicated in building their capacity related to Future Broadband Internet, Cloud Computing and Internet of Things are also welcome to participate.

TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Prof. Dr. Toni Janevski, tutor	tonij@feit.ukim.edu.mk (www.feit.ukim.edu.mk)
Dr. Marko Porjazoski, tutor's assistant	
Dr. Tomislav Shuminoski, tutor's assistant	

EVALUATION

The evaluation of the participants will be based on 80% from the average Quiz marks (average score from the quizzes) and 20% from the participation with substantive posts in the discussion forums, reflecting both the quantity and the quality of time spent on the course. Overall grade higher than 60% success ratio is required to complete the course and obtain an ITU certificate.

TRAINING SCHEDULE AND CONTENTS

Week	Activity	Exercises and interactions
Week 1	Module 1: Internet Fundamentals and Governance	Learning topics: <ul style="list-style-type: none">• Internet architectures• Internet protocols (IPv4, TCP, UDP, DHCP, DNS)• IPv6 and migration from IPv4 to IPv6• HTTP 2.0 and World Wide Web (WWW)

Week	Activity	Exercises and interactions
		<ul style="list-style-type: none"> • Internet networking (unicast, multicast) • IP interconnection, MPLS/IP and VPN • IP Quality of Service • Cybersecurity • Internet Governance
		Discussion / Forum
		Self test quiz
Week 2	Module 2: Future Broadband Access, SDN, and Cloud Computing	Learning topics: <ul style="list-style-type: none"> • Future gigabit copper access (xDSL) • Future optical access (NG-PONs, AON) • Carrier Ethernet • Submarine cable • Satellite broadband access • Software Defined Networking (SDN) and Network Function Virtualization (NFV) for fixed and mobile • ITU's Cloud Computing architectures and models (SaaS, PaaS, IaaS) • Cloud security and privacy • Clouds governance
		Discussion / Forum
		Self test quiz
Week 3	Module 3: Internet of Things, Big Data, and Artificial Intelligence	Learning topics: <ul style="list-style-type: none"> • ITU's Internet of Things (IoT) framework • Web of Things (WoT) • Critical IoT and massive IoT • Data management • Big Data architectures • Big Data-driven networking • IoT/data security, privacy and trust • Artificial Intelligence (AI) for Internet and telecoms • Business and regulatory aspects of IoT, Big Data and AI
		Discussion / Forum
		Self test quiz
Week 4	Module 4: Future Telecom, IoT/BigData/AI and OTT Services	Learning topics: <ul style="list-style-type: none"> • Future Telecom services • Future broadband OTT services (video, social networking, AR/VR, Web 2.0/3.0) • Industry 4.0 • Smart Sustainable Cities (SSC) • OTT and telecom clouds • Future clouds: edge and fog computing services • Future IoT/Big-Data/AI services • Network neutrality vs. QoS in telecom networks • Business and regulatory aspects of future telecom, IoT/BigData/AI and OTT services
		Discussion / Forum
		Self test quiz and Final Evaluation

METHODOLOGY

The course methodology will be as follows:

- Each module will be studied and discussed over a time period of one week;
- Course materials will be made available on a weekly basis;
- Discussion forums 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 tests will be assigned weekly, one per module, at the end of a given course week;
- All announcements for all events (materials, quizzes and forums) will be given in a timely manner (prior to the event) by the course tutor.

COURSE COORDINATION

Course coordinator: Name: Prof. Dr. Toni Janevski Email address: tonij@feit.ukim.edu.mk	ITU coordinator: Name: Jaroslav Ponder Email address: jaroslav.ponder@itu.int
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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>.

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/future-broadband-internet-cloud-computing-and-internet-things>

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/training-courses/full-catalogue/future-broadband-internet-cloud-computing-and-internet-things>

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-24822-P.40595.1.03

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.

CERTIFICATES

Each fully registered participant who will successfully complete the course, based on the evaluation, will receive an ITU Certificate after the course.