



ITU Academy

Regional Experiences from Europe and ICT Capacity Building Needs

Prof. Dr. Toni Janevski

Faculty of Electrical Engineering and Information Technologies
Ss. Cyril and Methodius University, Skopje

Email: tonij@feit.ukim.edu.mk



ITU Academy web portal

<http://academy.itu.int>

ITU Academy
URL

Here is given a
link to upcoming
ITU Academy
trainings

The GCBI
information

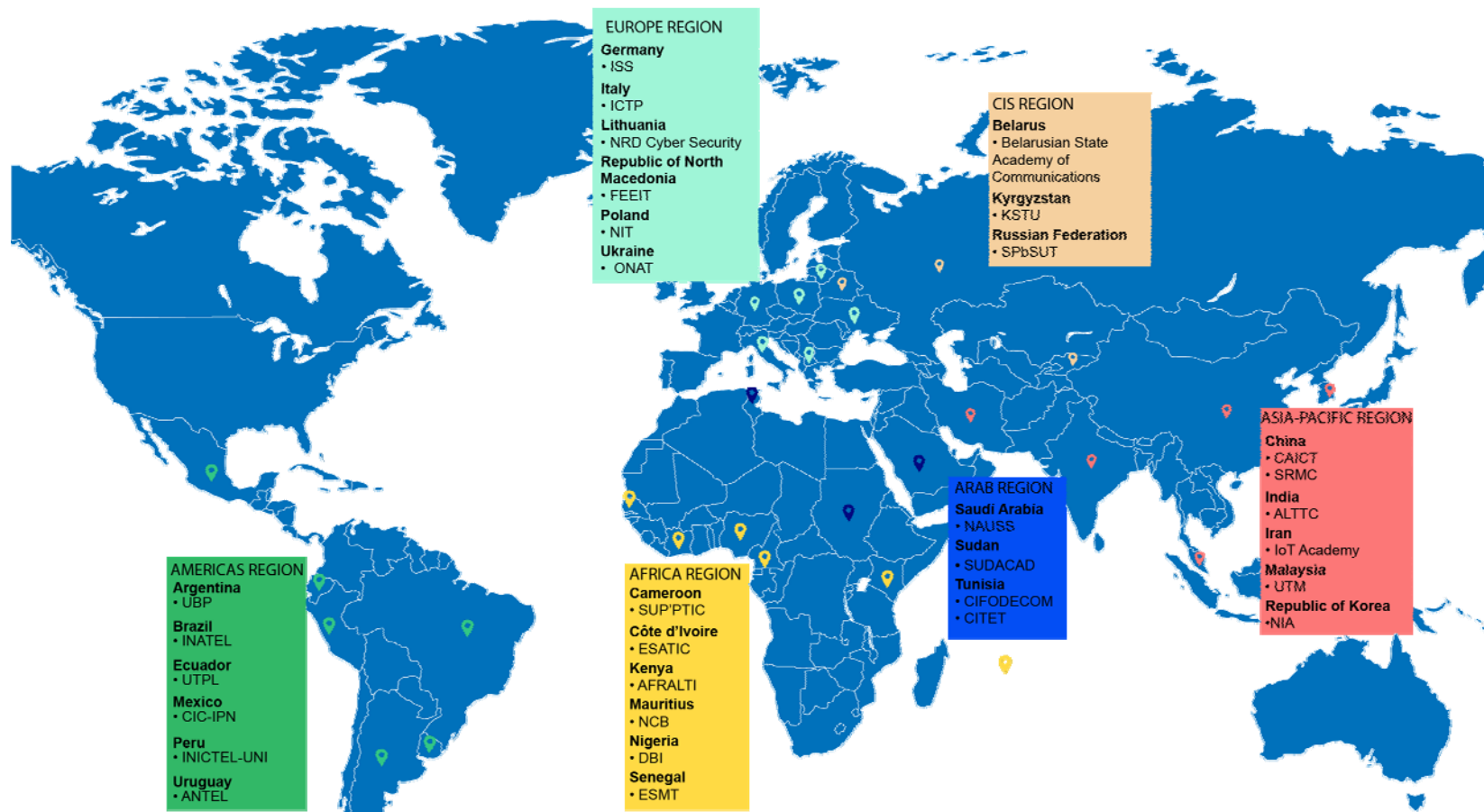
The screenshot shows the ITU Academy website interface. A red box highlights the URL <https://academy.itu.int/index.php?lang=en> in the browser's address bar. Another red box highlights the 'UPCOMING TRAININGS' section, which lists three courses: 'Protocolos de Comunicaciones para Internet de las...', 'Emerging Trends in Regulation of ICTs', and 'Legal and regulatory barriers to the introduction...'. A third red box highlights the 'GROUP ON CAPACITY BUILDING INITIATIVES (GCBI)' section, which states that GCBI works to assist ITU-D and contribute to the successful implementation of its capacity building activities. The website also features sections for 'COURSES', 'WHAT'S NEW', 'PARTNERSHIPS', and 'SUBSCRIBE'.

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ITU CoE global network

- The **ITU Centres of Excellence (CoE) network** in the current cycle 2019-2022 is composed of **31 Centres** across the globe, from which 6 CoEs are from Europe region, and other are located in other regions as given:



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User identification in the ITU Academy

ITU Academy user account is uniquely identified by the user's email address.

The screenshot displays the ITU Academy user interface. At the top, the ITU logo and 'empowering minds' tagline are visible. The user is logged in as 'TONI JANEVSKI'. The main navigation bar includes links for HOME, THE ACADEMY, TRAINING, EVENTS, MY PROFILE, MY COURSES, LEARNING RESOURCES, REGISTRATION, HELP, ARCHIVE, and MY INVOICES. The user's profile is shown with a header 'Toni Janevski' and a sub-header 'Toni Janevski'. The profile details include a profile picture, name, and email address 'tonij@feit.ukim.edu.mk', which is highlighted with a red box. A red arrow points from the text box on the left to this email address. The page also shows a sidebar with 'ADMINISTRATION', 'PEOPLE', 'LATEST NEWS', and 'RECENT ACTIVITY' sections. The main content area displays 'User details' with fields for Country (Macedonia), City/Town (Skopje), and various roles (Administration / Ministry, Administration / Regulator, Telecom / ICT Agency). The 'Email address' field is highlighted with a red box. The 'Miscellaneous' section lists links for Full profile, Blog entries, Notes, Forum posts, and Forum discussions. The 'Reports' section lists links for Today's logs, All logs, Outline report, Complete report, Statistics, and Browser sessions. The 'Login activity' section shows the last access to the course on Thursday, 7 September 2017, at 1:36 AM (1 sec).

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ITU Academy course cover page

Inside view

Title of the
ITU Academy
course.

Tutors and
coordinators.

The screenshot shows the ITU Academy course cover page for "GIGA SPEED WIRELESS AND MOBILE BROADBAND INTERNET". The page is viewed in a web browser with the URL <https://academy.itu.int/courses/course/view.php?id=1118>. The page features a navigation menu on the left with sections: ADMINISTRATION, PEOPLE, LATEST NEWS, and RECENT ACTIVITY. The main content area displays the course title, the ITU logo, and the ITU Centres of Excellence Network logo. The course is titled "GIGA SPEED WIRELESS AND MOBILE BROADBAND INTERNET". The tutor and coordinator is listed as Toni Janevski. The dates of the course are 21 Nov - 18 Dec 2017. The page also includes a section for "Giga Speed Wireless and Mobile Broadband Internet" with a background image of a globe and a radio tower.

Course: Giga Speed Wire X

International Telecommunications Union (ITU) [CH] | <https://academy.itu.int/courses/course/view.php?id=1118>

You are logged in as TONI JANEVSKI (LOG OUT)

HOME / TECHNOLOGIES AND SERVICES / 19264-GIGA SPEED WIRELESS AND MOBILE BROADBAND INTERNET

ITU Academy
empowering minds

ADMINISTRATION

- Course administration
 - Turn editing on
 - Edit settings
- Users
- Filters
- Reports
- Grades
- Badges
- Question bank
- Repositories
- Switch role to...

PEOPLE

- Participants

LATEST NEWS

- Add a new topic...
- Closing words on the ITU Academy course "Giga Speed Wireless and Mobile Broadband Internet"
- 20 Dec, 00:49 Toni Janevski
- Older topics ...

RECENT ACTIVITY

- Activity since Friday, 23 February 2018, 4:02 AM
- Full report of recent activity...
- No recent activity...

ITU Centres of Excellence Network

GIGA SPEED WIRELESS AND MOBILE BROADBAND INTERNET

Tutor & Coordinator: Toni Janevski
Training Coordinator:

Dates: 21 Nov - 18 Dec 2017

ITU Centres of Excellence Network for Europe

Giga Speed Wireless and Mobile Broadband Internet

Tutor & Coordinator: Prof. Dr. Toni Janevski
Tutor Assistants: Dr. Tomislav Shuminoski, Dr. Pero Latkoski
Training Coordinator: Jaroslav Ponder

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Types of ITU CoE courses in the Europe region

- **Face-to-face** courses:

- ☐ Typically at the premises of the CoE in the Europe region, with logistical support of the ITU Academy platform.

- **E-learning** courses:

- ☐ Typically delivered fully via the ITU Academy platform
- ☐ E-learning courses in Europe region are currently delivered in two modes:
 - **Classic** mode: 4 weeks e-learning course with written materials.
 - **Blended** mode: 8 days e-learning course with prerecorded video lectures (from a face-to-face ITU course).



ITU Academy e-learning courses:

Experiences in period 2014-2018

ITU Academy e-learning course	Year	Enrolled participants	Participants with certificates	Number of countries
Next Generation Broadband Internet Access	2015	139	86	40
Mobile Broadband	2015	157	77	36
Broadband Internet and Future Networks	2016	123	116	40
4G and Next Generation Mobile Internet	2016	73	65	36
NGN, cloud computing and ultra-broadband	2017	106	86	26
Giga Speed Wireless and Mobile Broadband Internet	2017	64	54	26
Future Broadband Internet Access	2018	109	100	38
Next Generation Mobile Broadband	2018	78	70	29

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Type of participants in ITU Academy e-learning courses

- Different types of participants follow a given e-learning course, and they are coming from different organizations, including:
 - ☐ National regulators
 - ☐ Government organizations and ministries
 - ☐ Network and service providers
 - ☐ Telecom and IT companies
 - ☐ Students from universities
 - ☐ Professors from academia and instructors from training centers
 - ☐ ...and every individual which want to update their knowledge or have up-to-date information in a given field
- Different participants may have different interests and different focuses in a single ITU e-learning course, since most of them are professionals
 - ☐ Working in telecommunications/ICT or related fields
- Let see some feedback from participants regarding their benefits from ITU e-learning practices



ITU e-learning Feedback from Participants: Broadband Internet and Future Networks (2016)

- I am at a desk job and this course has certainly added to my knowledge on the latest technologies. I found the course to be very useful.
- One of the most areas that would be benefited is net neutrality issues.
- The course helps us to have a more comprehensive view of the evolution of the Internet and broadband networks and their potential use in sustainable cities.
- The course is relevant as it makes me understand better the world of ICT. This is an advantage as when am analysing the data from administration side (supply side) i understand better. It also helps me in writing ICT related papers.
- n/a
- Sure, My organization is a provider. This course has added to my knowledge and i has understood the overview of Broadband Internet and Future Networks.
- It will help me in analysing the ICT statistics and writing reports on the same better
-
- I work for the Turkish Regulatory Body (ICTA) and Training materials include up to date information. Very helpful for the regulation side of the sector.
- It helps my organisation through proper understating of new technologies. Planning benefits a lot.
- I'm in academic sector, the main benefit is in order to study the ultimate regulation on telecommunications technologies.
- The mindset of the participants is definitely changed and right now I see things in a different perspective. I realise that there is no other way into the future than plan for the Future Networks.

- It provides a good understanding of where the ICT industry is currently at and the future of it (which is closer than we think). It provides for greater appreciation of the subject and helps in preparing for it.
- It provides a general point of view on the emerging technologies.
- It will contribute towards my daily work and enhance my knowledge on future networks and where technology is heading to and what to expect.
- My organization benefit from this course in many aspects. First we need to build our capacity in the novel new areas of ICTs like OTT, IoT, NGN, 5G, etc... in terms of the technical and legal aspects with the new economy challenges that we will be facing. So sharing best practices by discussing with other people all around the world is a very good way that has been possible within the course earned by ITU Academy. I'm a professional of Telecommunication but this course helped me understand some new guidelines and business trends of the economy. Thanks to all of you ...
- The organization was excellent and this e-learning course was very informative, very well presented, plus enjoyable.

Thanks for all.

- I am more enlightened.

I will assist my organization to understand the Broadband and Future Networks trends so

Each ITU course has participants from
regulators, operators, academic sector...

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ITU e-learning Feedback from Participants: Giga Speed Wireless and Mobile Broadband Internet (2017)

In your opinion, how your organization benefiting from the knowledge and experience you acquired through this course? *Please explain*

- in near future, this knowledge would be in every day use in terms of planning of our organization.
- Better understanding for the upcoming network
- more confident in dealing with 4G/LTE devices, better understanding
- future RFP preparation can be done easily
- Our organization is Communications Regulatory Authority seeking the most advanced technological progress and quality of services. The main functions are supervision of radio spectrum and consistent planning of radio frequencies. So, the experience of the course may be applied in in our daily work, for example drafting national plans for 5G installation.
- All information is usefull and will be applied in development of future regulatory documents.
Also received knowledge and experience increase professional level.
- With my better overlook on this topic
- This course will help my organization to be better prepared for the future of Mobile telephony.
- i have acquired lot of knowledge related to lot of technologies that have been detailed in this course and on my side IoT topics were so informative and according to that i am planning to come up with some IoT project using this course as guidance to easily implement it
- As Telecoms regulator, I am supposed to be on top of issues to enable me regulate all aspects of the telecoms industry. As such the knowledge i have acquired would be very beneficial in this aspect in that the content were up-to-date and dealt into the future.
- I work for regulatory department and therefore, learning from ITU courses better equip me for Policy/Regulatory discussions

- The course deals with antecedents, topics and aspects in process and on topics that will be discussed in the world radiocommunication conferences in the near future and this is fundamental for the administrations and for the personnel that prepare the documentation of officials that will participate in them. It shares knowledge that is important for making future decisions.
- This course has better my knowledge in wireless transmission field. This will benefit the organization in any wireless transmission works that may be assigned to me.
- The course allowed me to know relevant aspects of the current and new technologies that will help me in the moment of interpreting the current regulation in the region and propose new regulations as they are implemented in the telecommunications market.
- Knowledge about these things are essential to do the job and meet the targets (supervise that use of radio equipment don't cause harmful radio interferences).
This course was great opportunity substantially update knowledge about mobile technologies in short time.
- Permanent employee improvement brings benefits to any organization, and studying up-to-date material about ever-evolving technologies is a guarantor of stability and innovation in every field.
- This training allowed me to understand the issues of 5G technology and the benefits it will bring us in the future

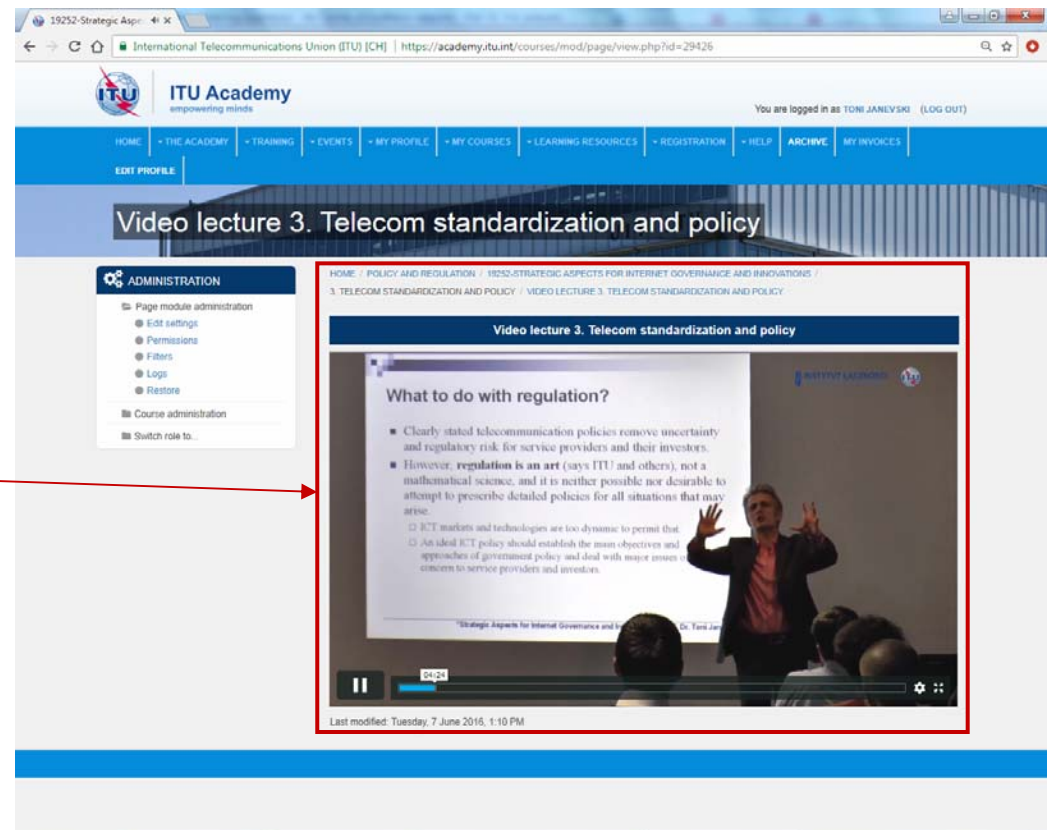
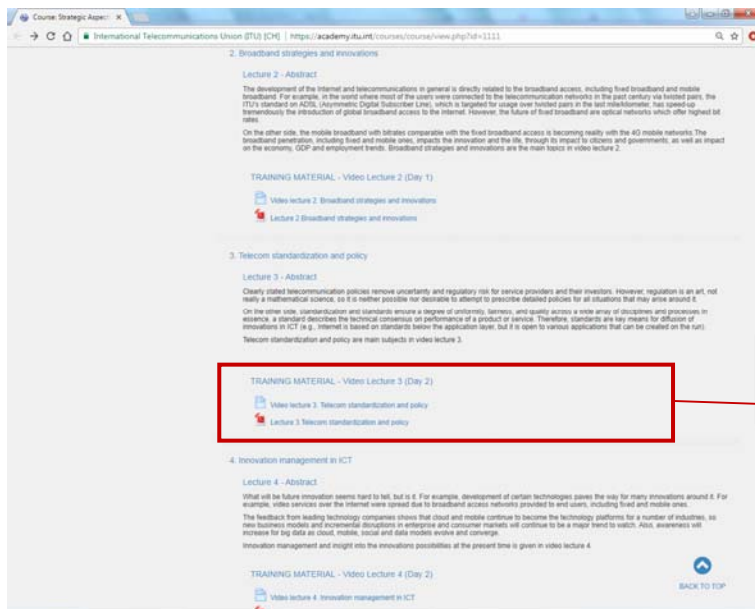
One the most challenging issues for course participants is to prepare themselves, their organizations and their countries for the future...

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ITU CoEs collaboration: E-learning based on face-to-face training

- ITU face-to-face training (in Warsaw 2015) is video recorded and after the post-production it is used for ITU e-learning course on the ITU Academy in 2016, 2017, 2018, and 2019.



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And again the same, because it was a success!

- ITU face-to-face training (in Warsaw 2016) is video recorded and after the post-production it is used for ITU e-learning course on the ITU Academy in 2017, 2018, and scheduled for 2019... and so on next year...

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The global power of ITU Academy

- In **ITU Academy e-learning courses** held by CoEs in the Europe region in period 2014-2018 (4 years) there were participants from more than **130 countries**:
 - Around 30 countries from Europe region
 - More than 100 countries from all other regions around the globe.

- This is **awesome** global reach, but why is that possible?
 - Because **ITU is respected** in the ICT/telecom world, particularly among regulators and telecom operators.
 - Due to **consistency and quality of ITU e-learning courses** delivery via the ITU Academy platform.
 - Last, but not the least important, **due to ITU Academy platform, its features, reliability and scalability.**



Issues for the ITU Academy success story everywhere?



- ITU and Academia (Professors/Instructors/Experts) need:
 - To provide **excellence of the training** (including organization, creation, coordination, delivery, and certification)
 - To provide diversity of ITU Academy trainings
 - For **capacity building of all ages**, with focus to ICT professionals
 - To deliver information about a given ITU course to different parties (that is the course marketing)
 - To **complement university level education** on long terms
 - This is crucial for the success.
- ITU Academy as a single web-based platform needs:
 - To maintain **high reliability** (e.g., administrators' work)
 - To continue with the online and offline (with invoices) **payments** for course enrolments
 - To continue all **different tools** for courses delivery



Digital skills – let define them!

- **Basic digital skills** (“digitally literate”): skills that are required by every individual to use digital applications to communicate, and to use basic Internet search with awareness about security and/or privacy concerns.
- **Intermediate digital skills:** include all basic digital (i.e., ICT) skills and additionally skills required in a workplace.
 - skills needed to critically evaluate some technology or create contents.
- **Advanced digital skills:** These skills are targeted for more complex jobs in the ICT sector, including deployment of networks and services or development of new ICT/digital technologies.
 - skills for IoT, Big Data, Artificial Intelligence (AI), QoS, cybersecurity, mobile applications development, etc.
 - ICT entrepreneurship skills, which include business, finance, and digital aspects and innovations.



What are emerging ICT trends and priorities in Europe region?

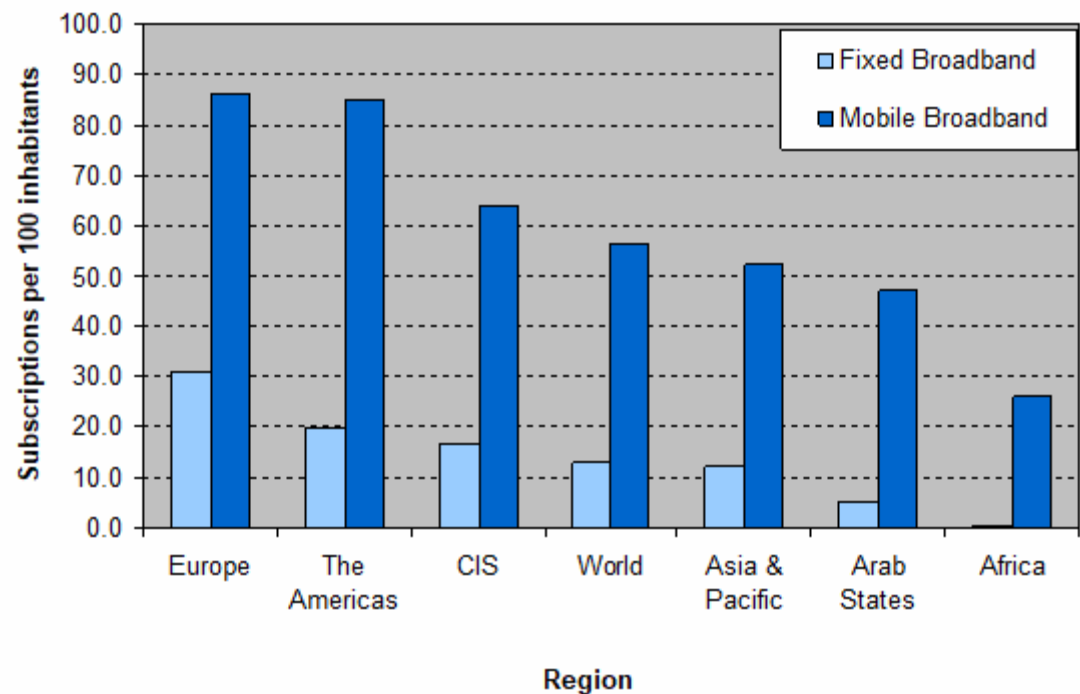
- Broadband and ultra-broadband access;
- Mobile broadband, in particular 4G/4.5G and 5G technologies;
- Next Generation Networks (NGNs);
- The emerging Internet of Things (IoT);
- Cloud Computing - the basis for most of the online services;
- Big data - based on all devices and humans connected to the Internet;
- Artificial Intelligence (AI), with many potential uses in ICT technologies and services;
- Many new and emerging ICT services and applications (including those provided by telecom operators as well as OTT applications).



Required skills:

Broadband and ultra-broadband

- **understand ultra-broadband** Internet access,
- **design, deploy and operate** broadband and ultra-broadband networks
- **perform technical, business and regulatory work** regarding broadband/ultra-broadband access services;
- **provide different services** over the same broadband access with the required QoS and security.

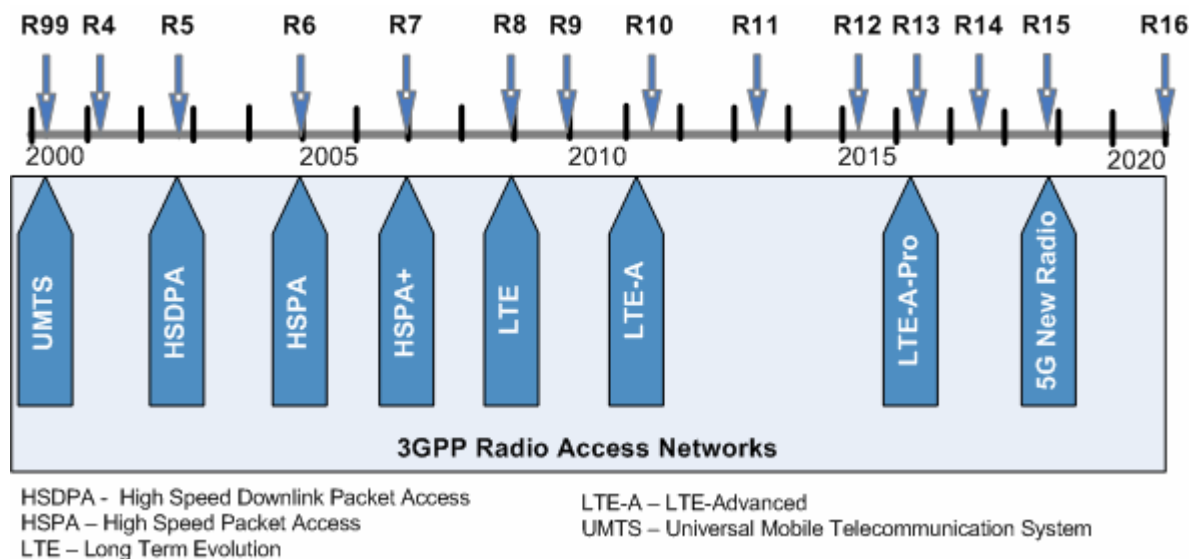




Required skills:

Mobile broadband and 5G

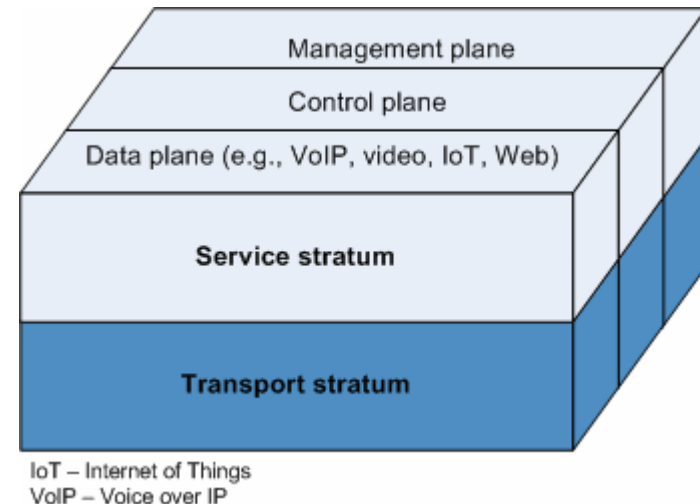
- **design of heterogeneous mobile networks** for achieving gigaspeeds by utilizing new versions of 4G mobile networks (e.g., LTE-Advanced-Pro) and the new 5G;
- **skills to design a low latency next-generation core for 5G**, as well as to understand and use SDN/NFV for 5G;
- **skills for spectrum management** for the IMT networks (3G, 4G, 5G);
- **business and regulatory features of 5G** mobile broadband, particularly in respect to spectrum, QoS, security, and provision of mobile services.





Required skills: NGN and IPv6

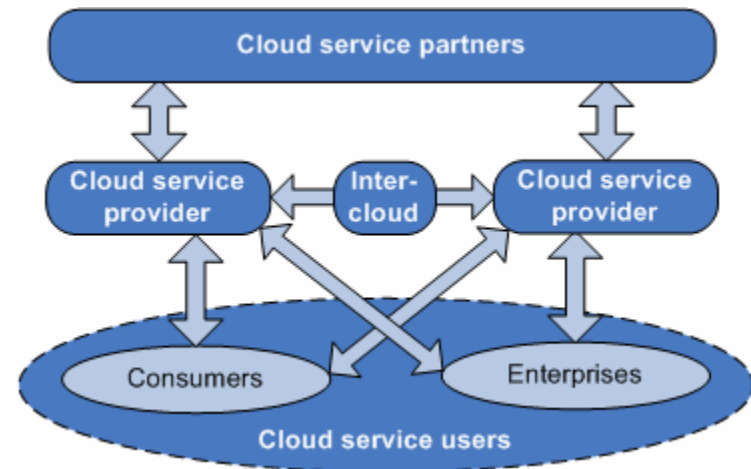
- **NGN standards** and their practical implementation;
- the use of **service architecture in NGN**, including standardized control and signaling;
- implementation of **IPv4 to IPv6 transition** in NGN;
- management of **performance measurements** in NGN;
- **awareness of future evolution** of NGN;
- developing **business and regulatory skills** for NGNs.





Required skills: Cloud computing

- **understanding frameworks for cloud computing**, including systems, architectures and service models (IaaS, PaaS, SaaS), as well as OTT and telecom cloud implementations;
- the **use of cloud computing for** development of new emerging OTT services, e.g., services needed for the digital economy;
- performing **technical, business and regulation analysis for cloud computing**, including various OTT and telecom-based cloud computing services;
- **skills to regulate security and privacy issues** for cloud computing services, particularly in multi-tenancy cases.





Required skills:

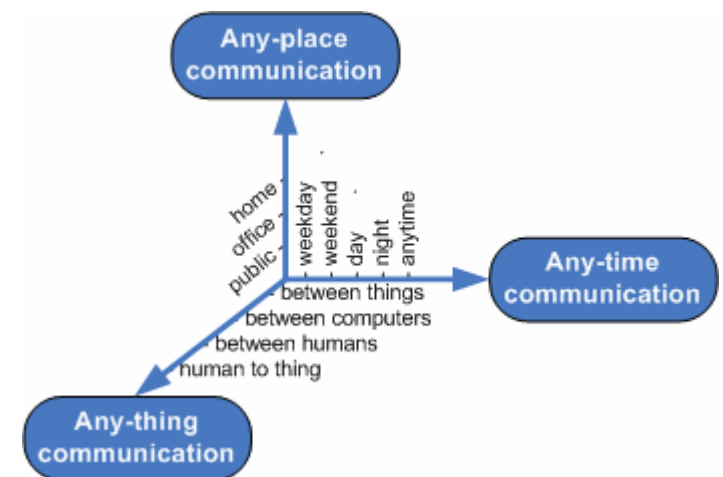
ICT services and applications

- **implementation and operation of NGN services** over broadband access (including VoIP, IPTV, and virtual private networks for business users);
- **implementation and operation of OTT (data) services**, such as OTT voice (e.g., Skype, Viber, WhatsApp), social networks (e.g., Facebook, Twitter), video sharing (e.g., YouTube), clouds (e.g., Google drive), online gaming platforms (e.g., Steam), and many others in different application ecosystems (e.g., PlayStore, iStore);
- **development of digital services** for transfer of all governmental/institutional services from a paper to a digital form;
- **digital economy services**, such as banking, shopping, and trading over the Internet;
- **business and regulatory aspects** for broadband Internet services.



Required skills: Internet of Things

- Smart grid and energy require **skills to provide smart energy distribution**, with perimeter access controlled by IoT sensors.
- For **driverless cars** a plethora of technologies are required, including wireless and mobile technologies, IoT sensors, etc., which require **advanced ICT skills**.
- The next industry revolution (**Industry 4.0**) requires **IoT experts** to take the leading role in the development of so-called smart factories which will be self-sufficient.
- **Skills for development and deployment** of augmented traffic control, intelligent agriculture, smart health, smart government, smart cities, smart homes...
- **Skills for** identification and implementation of different **business models for IoT** services.





Required skills:

Quality of Service (QoS)

- skills for **QoS and Quality of Experience (QoE)** in fixed and **mobile** networks and services, and selecting the proper set of key performance indicators (KPIs);
- skills for **planning and design of fixed and mobile networks** with given QoS constraints;
- skills to perform **QoS regulation** regarding the ICT/telecom market and the requirements for different groups of end-users, including human users as well as machines as end-devices;
- understanding **network neutrality** and implementing it in practice;
- skills to analyze and develop appropriate **business models for services that require certain QoS guarantees**, together with traffic management techniques.



Required skills: **Cybersecurity**

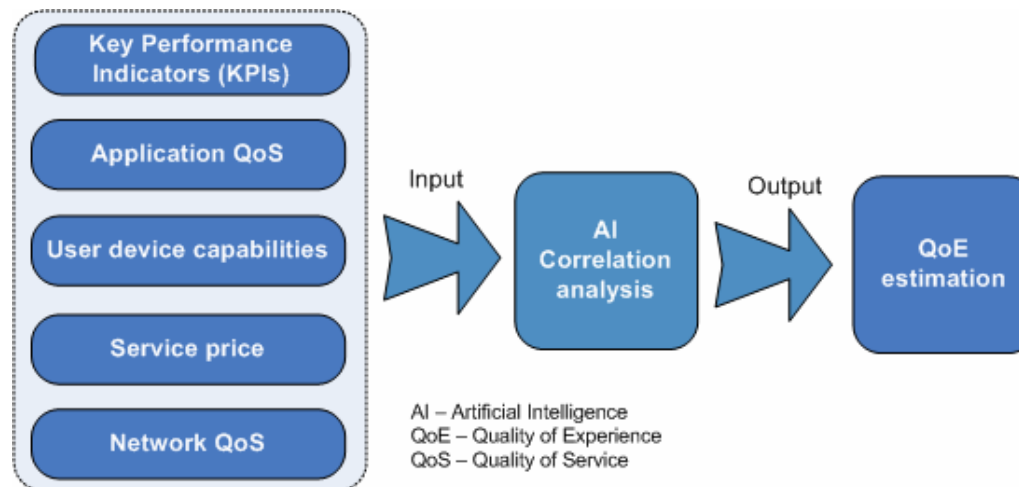
- on a **national level skills** are required for the development of national **cybersecurity strategies**, policies and response capabilities;
- on a **regional level skills** are needed for **harmonization** of different policies, national legal frameworks, as well as good practices;
- on the **international level** human capacity is required for building **international cooperation** frameworks and exchange of information on **cybersecurity** attacks and counter measures;
- skills for development of **security solutions for the new services** such as IoT and critical services;
- skills to provide **secure networks and services by telecom operators** and OTT service providers.



Required skills:

Big Data and Artificial Intelligence (AI)

- **skills for AI-based automation** for network design, operation and maintenance, as well as increased efficiency with network self-optimization;
- use of **AI for support of different services**, including smart homes, smart cities, smart transportation, or smart industry;
- skills for **use of big data** techniques;
- **educating governments, businesses and customers**, as to how to use big data and AI with the aim of introducing **new business models**.





Summary

- **ITU CoE in Europe** region in the last 4 years period was very successful, educating around **1000 participants** from **more than 130 countries** from all regions.
 - ITU CoE network with the **ITU Academy platform** provide timely and quality **capacity building** for all such issues **to everyone around the globe**.
- There are continuously **new needs for capacity building** that appear with the **new technologies**.
 - In the Europe region the most required capacity needs building refer to **advanced ICT skills** from technology, regulation and business aspects;
 - Emerging **ICT trends and priorities** in Europe region and globally include broadband and ultra-broadband, 5G mobile, NGN, IoT, Cloud Computing, Big data, Artificial Intelligence (AI), emerging ICT services/applications for the **all-digital world**...



Thank you for your attention!