

Participation of Academic Institutions in ITU Study Groups (August 2015)

Today, almost 100 leading Academic Institutions participate in the work of the ITU working together with 193 Member States, 700 private sector entities, and other stakeholders to set international standards and best practices. There are many thematic areas of ITU's work where your university can benefit and contribute, such as **cybersecurity, cloud computing, broadcasting, multimedia, smart sustainable cities, Internet of things, radiowave propagation, IPv6, climate change, spectrum management, e-government, broadband deployment**, and more. In total, ITU (across 3 sectors: Radiocommunication, Standardization and Development) with its membership is working on 403 questions. We invite you to consult topics of Study Groups by Sectors that might be of interest to you and also invite you to consult **Annex with all Questions**.

ITU Radiocommunication Sector and ITU-R Study Groups

The mission of the ITU Radiocommunication Sector is, inter alia, to ensure rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including those using satellite orbits, and to carry out studies and adopt recommendations on radiocommunication matters. The ITU-R Study Groups develop the technical bases for decisions taken at World Radiocommunication Conferences and develop global standards (Recommendations), Reports and Handbooks on radiocommunication matters. More than 4 000 specialists, from administrations, the telecommunications industry as a whole and academic organizations throughout the world, participate in the work of the Study Groups on topics such as efficient management and use of the spectrum/orbit resource, radio systems characteristics and performance, spectrum monitoring and emergency radiocommunications for public protection and disaster relief.

- SG 1 Spectrum Management
- SG 3 Radiowave Propagation
- SG 4 Satellite Services
- SG 5 Terrestrial Services
- SG 6 Broadcasting Service
- SG 7 Science Services

ITU Standardization Sector and ITU-T Study Groups

The Study Groups of ITU's Telecommunication Standardization Sector (ITU-T) assemble experts from around the world to develop international standards known as ITU-T Recommendations which act as defining elements in the global infrastructure of information and communication technologies (ICTs). Standards are critical to the interoperability of ICTs and whether we exchange

voice, video or data messages, standards enable global communications by ensuring that countries' ICT networks and devices are speaking the same language.

- SG 2 Operational aspects
- SG 3 Economic and policy issues
- SG5 Environment and climate change
SG9 Broadband cable and TV
- SG 11 Protocols and test specifications
- SG 12 Performance, QoS and QoE
- SG 13 Future networks (& cloud)
- SG 15 Transport, Access and Home
- SG 16 Multimedia
- SG 17 Security
- SG 20 IoT and applications, smart cities

ITU Development Sector and ITU-D Study Groups

ITU-D Study Groups are responsible for developing **Reports, Guidelines, and Recommendations** based on input received from the membership. Information is gathered through surveys, contributions and case studies and is made available for easy access by the membership using content management and web publication tools. The Study Groups examine specific task-oriented telecommunication/ICT questions of priority to developing countries, to support them in achieving their development goals.

- SG 1 Enabling environment for the development of telecommunications/ICTs
- SG 2 ICT applications, cybersecurity, emergency telecommunications and climate-change adaptation

Annex. Study Groups Questions.

Sector	Study Groups	Questions
Radiocommunication	SG 1 Spectrum Management	- Spectrum engineering techniques
		- Spectrum management methodologies and economic strategies
		- Spectrum monitoring
	SG 3 Radiowave Propagation	- Propagation fundamentals
		- Point-to-area propagation
		- Ionospheric propagation and radio noise
		- Point-to-point and Earth-space propagation
	SG 4 Satellite Services	- Efficient orbit/spectrum utilization for FSS and BSS
		- Systems, air interfaces, performance and availability objectives for FSS, BSS and MSS, including IP-based applications and satellite news gathering
		- Efficient orbit/spectrum utilization for MSS and RDSS
	SG 5 Terrestrial Services	- Land mobile service excluding IMT; amateur and amateur-satellite service
		- Maritime mobile service including the Global Maritime Distress and Safety System (GMDSS); the aeronautical mobile service and the radiodetermination service
		- Fixed wireless systems; HF systems in the fixed and land mobile services
		- IMT Systems
		- Terrestrial broadcasting delivery
	SG 6 Broadcasting Service	- Broadcast service assembly and access
		- Programme production and quality assessment
		- Time signals and frequency standard emissions
	SG 7 Science Services	- Space radiocommunication applications
		- Remote sensing systems
		- Radio astronomy

Standardization	SG 2 Operational aspects	- Application of numbering, naming, addressing and identification plans for fixed and mobile telecommunication services
		- Routing and interworking plan for fixed and mobile networks
		- Service and operational aspects of telecommunications, including service definition
		- Human factors related issues for improvement of the quality of life through international telecommunications
		- Requirements, priorities and planning for telecommunication management and OAM Recommendations
		- Service and Network Operations group (SNO)
		- Management architecture and security
		- Interface specifications and specification methodology
		SG 3 Economic and policy issues
	- Development of charging and accounting/settlement mechanisms for international telecommunications services, other than those studied in Question 1/3, including adaptation of existing D-series Recommendations to the evolving user needs	
	- Study of economic and policy factors relevant to the efficient provision of international telecommunication services	
	- Regional studies for the development of cost models together with related economic and policy issues	
	- Terms and definitions for Recommendations dealing with tariff and accounting principles together with related economic and policy issues	
	- International Internet Connectivity including relevant aspects of IP peering, regional traffic exchange points, cost of provision of services and impact of transition from IPv4 to IPv6	
	- International Mobile Roaming issues (including charging, accounting and settlement mechanisms and roaming at border areas)	
- Alternative Calling Procedures and Misappropriation and Misuse of facilities and services including CLI, CPND and OI.		

		- Economic and regulatory impact of the Internet, convergence (services or infrastructure) and new services, such as OTT, on international telecommunication services and networks
		- Definition of relevant markets, competition policy and identification of operators with SMP as it relates to the economic aspects of the international telecommunication services and networks
	SG5 Environment and climate change	- Protective components and assemblies
		- Interference to telecommunication networks due to power systems and electrified railway systems
		- Resistibility and safety in telecommunications
		- Lightning protection and earthing of telecommunication systems
		- EMC issues arising from the convergence of IT and communication equipment
		- Human exposure to electromagnetic fields (EMFs) due to radio systems and mobile equipment
		- EMC issues in home networks
		- Generic and product family EMC recommendations for telecommunication equipment
		- Security of telecommunication and information systems concerning the electromagnetic environment
		- EMC requirements for the information society
		- Guides and terminology on environment and climate change
		- Environmental impact reduction including e-waste
		- Setting up a low-cost sustainable telecommunication infrastructure for rural communications in developing countries
		- ICTs and adaptation to the effects of climate change
		- Leveraging and enhancing the ICT environmental sustainability
		- Energy efficiency for the ICT sector and harmonization of environmental standards
		- Methodologies for the assessment of environmental impact of ICT
		- Power feeding systems
		- Smart Sustainable Cities and Communities (SSCC)

	SG9 Broadband cable and TV	- Transmission of television and sound programme signal for contribution, primary distribution and secondary distribution
		- Measurement and control of the end-to-end quality of service (QoS) for advanced television technologies, from image acquisition to rendering, in contribution, primary distribution and secondary distribution networks
		- Methods and practices for conditional access, protection against unauthorized copying and against unauthorized redistribution
		- Software components application programming interfaces (APIs), frameworks and overall software architecture for advanced content distribution services
		- Functional requirements for residential gateway and set-top box for the reception of advanced content distribution services
		- Digital programme delivery controls for multiplexing, switching and insertion in compressed bit streams
		- Cable television delivery of digital services and applications that use Internet protocol (IP) and/or packet-based data
		- The IP enabled multimedia applications and services for cable television networks enabled by converged platforms
		- Requirements for advanced service capabilities over broadband cable home networks
		- Requirements, methods, and interfaces of the advanced service platforms to enhance the delivery of sound, television, and other multimedia interactive services over cable television network
		- Transmission of multichannel analogue and/or digital television signals over optical access networks
		- Objective and subjective methods for evaluating perceptual audiovisual quality in multimedia services
		- Work programme, coordination and planning
	SG 11 Protocols and test specifications	- Signalling and protocol architectures in emerging telecommunication environments
		- Signalling requirements and protocols for service and application in emerging telecommunication environments
		- Signalling Requirements and Protocol for Emergency Telecommunications
		- Signalling requirements and protocols for Bearer and Resource control in emerging telecommunication environments

		- Protocol procedures relating to services provided by Broadband Network Gateways
		- Protocol procedures relating to specific services over IPv6
		- Signalling and control requirements and protocols for network attachment supporting multi-screen service, future networks, and M2M
		- Guidelines for implementations of signalling requirements and protocols
		- Protocols supporting distributed, smart service networking and end-to-end multicast
		- Service and networks benchmarking measurements
		- Protocols and networks test specifications; frameworks and methodologies
		- Internet of things test specifications
		- Monitoring parameters for protocols and emerging networks
		- Cloud interoperability testing
		- Testing as a service (TAAS)
	SG 12 Performance, QoS and QoE	- SG 12 work programme and QoS/QoE coordination in the ITU-T
		- Definitions, guides and frameworks related to QoS/QoE
		- Speech transmission characteristics of communication terminals for fixed circuit-switched, mobile and packet-switched (IP) networks
		- Hands-free communication and user interfaces in vehicles
		- Quality of Service Development Group
		- Telephonometric methodologies for handset and headset terminals
		- Analysis methods using complex measurement signals including their application for speech enhancement techniques and hands-free telephony
		- Methods, tools and test plans for the subjective assessment of speech, audio and audiovisual quality interactions
		- E-Model extension in wideband transmission and future telecommunication and application scenarios
		- Perceptual-based objective methods for voice, audio and visual quality measurements in telecommunication services
		- Conferencing and telemeeting assessment
		- Performance interworking and traffic management for Next Generation Networks

		- Operational aspects of telecommunication network service quality
		- QoE, QoS and performance requirements and assessment methods for multimedia
		- Development of parametric models and tools for multimedia quality assessment
		- Objective assessment of speech and sound transmission performance quality in networks
		- Framework for diagnostic functions and their interaction with external objective models predicting media quality
		- Performance of packet-based networks and other networking technologies
	SG 13 Future networks (& cloud)	- Service scenarios, deployment models and migration issues based on convergence services
		- Requirements for NGN evolution (NGN-e) and its capabilities including support of IoT and use of software-defined networking
		- Functional architecture for NGN evolution (NGN-e) including support of IoT and use of software-defined networking
		- Identification of evolving IMT systems and beyond
		- Applying IMS, IMT and other new technologies in developing country mobile telecom networks
		- Requirements and mechanisms for network QoS enablement
		- Deep packet inspection in support of service/application awareness in evolving networks
		- Security and identity management in evolving managed networks
		- Mobility management
		- Coordination and management for multiple access technologies
		- Evolution of user-centric networking, services, and interworking with networks of the future including Software-Defined Networking
		- Distributed service networking
		- Requirements, mechanisms and frameworks for packet data network evolution
		- Software Defined-Networking and Service-aware networking of future networks
		- Data-aware networking in future networks
		- Environmental and socio-economic sustainability in future networks and early realization of FN

		- Requirements, ecosystem, and general capabilities for cloud computing and big data
		- Cloud functional architecture, infrastructure and networking
		- End-to-end Cloud computing management and security
	SG 15 Transport, Access and Home	- Coordination of access and Home Network Transport standards
		- Optical systems for fibre access networks
		- General characteristics of transport networks
		- Broadband access over metallic conductors
		- Characteristics and test methods of optical fibres and cables
		- Characteristics of optical systems for terrestrial transport networks
		- Characteristics of optical components and subsystems
		- Characteristics of optical fibre submarine cable systems
		- Transport network protection/restoration
		- Interfaces, Interworking, OAM and Equipment specifications for Packet based Transport Networks
		- Signal structures, interfaces, equipment functions, and interworking for transport networks
		- Transport network architectures
		- Network synchronization and time distribution performance
		- Management and control of transport systems and equipment
		- Communications for Smart Grid
		- Outside plant and related indoor installation
		- Maintenance and operation of optical fibre cable networks
		- Broadband in-premises networking
	SG 16 Multimedia	- Multimedia systems, terminals and data conferencing
		- Packet-based conversational multimedia systems and functions
		- Multimedia gateway control architectures and protocols
		- Telepresence systems
		- Visual coding
		- System and coordination aspects of media coding
		- Speech and audio coding and related software tools
		- Multimedia application platforms and end systems for IPTV

		- Digital signage systems and services
		- Voiceband signal discrimination and modem/facsimile terminal protocols
		- Signal processing network functions and equipment
		- Multimedia coordination
		- Multimedia framework, applications and services
		- IoT applications and services
		- Accessibility to multimedia systems and services
		- Vehicle gateway platform for telecommunication/ITS services/applications
		- Multimedia framework for e-health applications
	SG 17 Security	- Telecommunication/ICT security coordination
		- Security architecture and framework
		- Telecommunication information security management
		- Cybersecurity
		- Countering spam by technical means
		- Security aspects of ubiquitous telecommunication services
		- Secure application services
		- Cloud computing security
		- Telebiometrics
		- Identity management architecture and mechanisms
		- Generic technologies to support secure applications
		- Formal languages for telecommunication software and testing
	SG 20 IoT and applications, smart cities	- Requirements and use cases for IoT and its capabilities
		- Functional architecture for IoT
		- IoT applications and services
		- IoT user centric networking and services, including interworking
		- IoT in Smart Sustainable Cities and Communities
		- Signalling and protocol architectures for IoT
Development	SG 1 Enabling environment for the development of	- Policy, regulatory and technical aspects of the migration from existing networks to broadband networks in developing countries, including next-generation networks, m-services, OTT services and the implementation of IPv6

	telecommunications/ICTs	
		- Broadband access technologies, including IMT, for developing countries
		- Access to cloud computing: challenges and opportunities for developing countries
		- Economic policies and methods of determining the costs of services related to national telecommunication/ICT networks, including next-generation networks
		- Telecommunications/ICTs for rural and remote areas
		- Consumer information, protection and rights: Laws, regulation, economic bases, consumer networks
		- Access to telecommunication/ICT services by persons with disabilities and with specific needs
		- Examination of strategies and methods of migration from analogue to digital terrestrial broadcasting and implementation of new services
	SG 2 ICT applications, cybersecurity, emergency telecommunications and climate-change adaptation	- Creating the smart society: Social and economic development through ICT applications
		- Information and telecommunications/ICTs for e-health
		- Securing information and communication networks: Best practices for developing a culture of cybersecurity
		- Assistance to developing countries for implementing conformance and interoperability programmes
		- Utilization of telecommunications/ICTs for disaster preparedness, mitigation and response
		- ICT and climate change
		- Strategies and policies concerning human exposure to electromagnetic fields
		- Strategies and policies for the proper disposal or reuse of telecommunication/ICT waste material
		- Identification of study topics in the ITU-T and ITU-R study groups which are of particular interest to developing countries

