BUILDING CAPACITY FOR THE DIGITAL ECONOMY -
ITU ACTIVITIES IN IOT

ICTP -11 MAY 2018

Presented by:

Mike Nxele
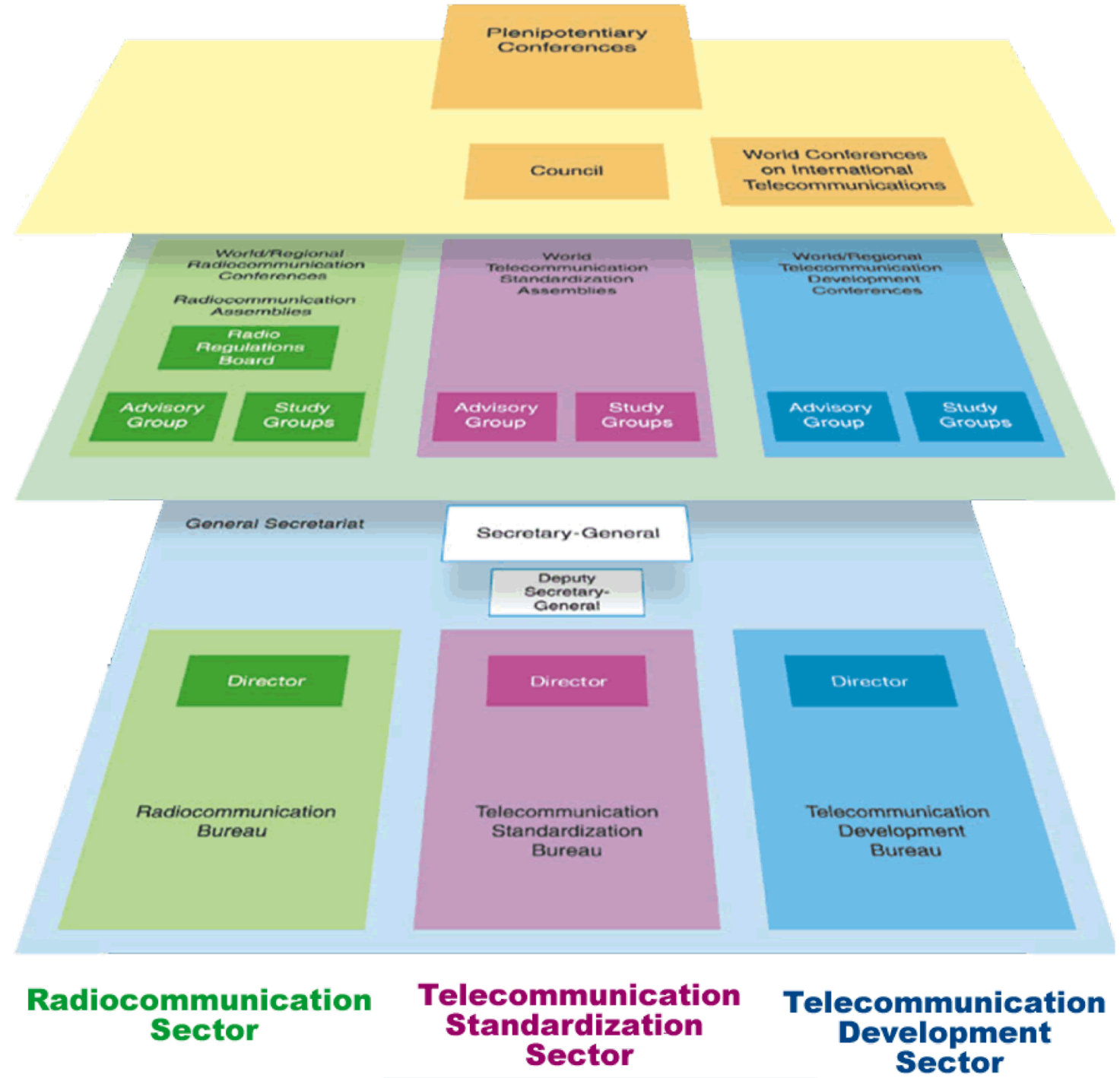**Senior Human Capacity Building Officer, HCB/PKM/BDT**

PRESENTATION OUTLINE

ITU Structure

193 Member states

Over 750 Sector members

ITU-D: KEY OBJECTIVES

- To foster international cooperation on telecommunication and ICT development issues
- To foster an enabling environment for ICT development and foster the development of telecommunication and ICT networks
- To enhance confidence and security in the use of telecommunication and ICTs
- To build human and institutional capacity, provide data and statistics, promote digital inclusion and provide concentrated assistance to countries in special need
- To enhance environmental protection, climate change adaptation and mitigation and disaster-management efforts through telecommunication and ICTs

ITU-D SG1 and SG2 Questions under study (2018-2021)

SG1: Enabling environment for the development of telecommunications/ICTs

| Study Question	Relevant SDG WSIS Action Line
Q1/1: Strategies and policies for the deployment of broadband in developing countries	
Q2/1: Strategies, policies, regulations and methods of migration and adoption of digital broadcasting and implementation of new services	
Q3/1: Emerging technologies, including cloud computing, m-services, and OTTs: Challenges and opportunities, economic and policy impact for developing countries	
Q4/1: Economic policies and methods of determining the costs of services related to national telecommunication/ICT networks	
Q5/1: Telecommunications/ICTs for rural and remote area	
Q6/1: Consumer information, protection and rights: Laws, regulation, economic bases, consumer networks	
Q7/1: Access to telecommunication/ICT services by persons with disabilities and other persons with specific needs	

SG2: ICT services and applications for the promotion of sustainable development

Study Question	Relevant SDG WSIS Action Line
Q1/2: Creating smart cities and society: Employing ICTs for sustainable social and economic development	
Q2/2: Telecommunications/ICTs for e-health	
Q3/2: Securing information and communication networks: Best practices for developing a culture of cybersecurity	
Q4/2: Assistance to developing countries for implementing conformance and interoperability (C&I) programmes and combating counterfeit ICT equipment and theft of mobile devices	
Q5/2: Utilizing telecommunications/ICTs for disaster risk reduction and management	
Q6/2: ICT and the environment	
Q7/2: Strategies and policies concerning human exposure to electromagnetic fields	

ITU-D study groups assist Member States in achieving their SDG targets and development goals

Digital Transformation

Industry 4.0 framework and contributing digital technologies
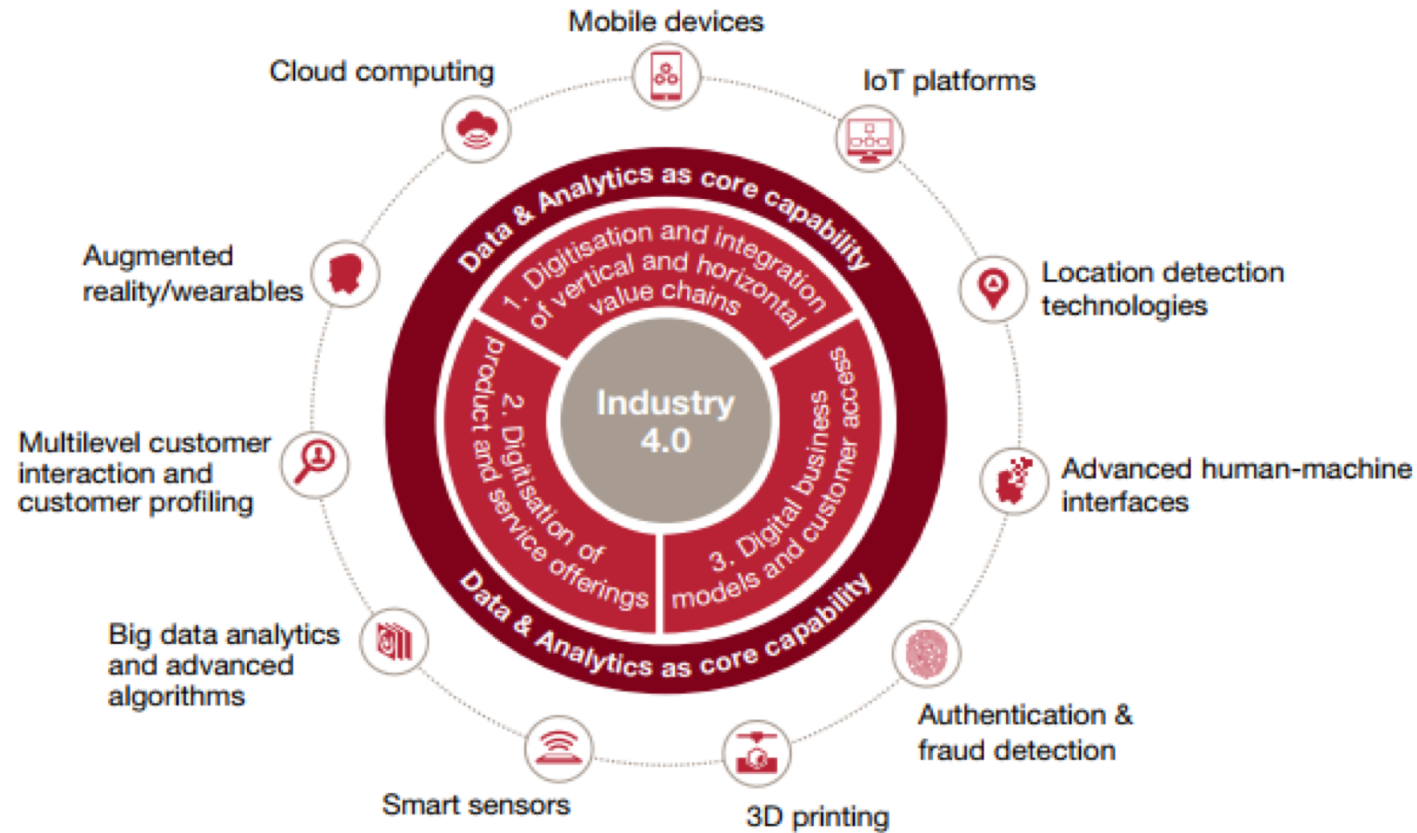
IoT and the digital economy

Smart Society Ecosystem

The 10 skills you need to thrive in the Fourth Industrial Revolution

Top 10 skills

in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

World economic forum 2016

ITU-D : The Motivation for capacity building

- [] From Technology to Development

- [] The Digital Divide is increasingly becoming a Knowledge divide

- [] IoT and the entire Fourth Industrial revolution ecosystem threatens to widen the digital divide…….. Unless we do something

- [] Capacity building , knowledge dissemination and skills development are tools at our disposal to at best bridge this divide before it takes effect.

A holistic approach to digital inclusion

☐ The ICT development process, and a country's evolution towards becoming an information society, can be depicted using the three-stage model illustrated
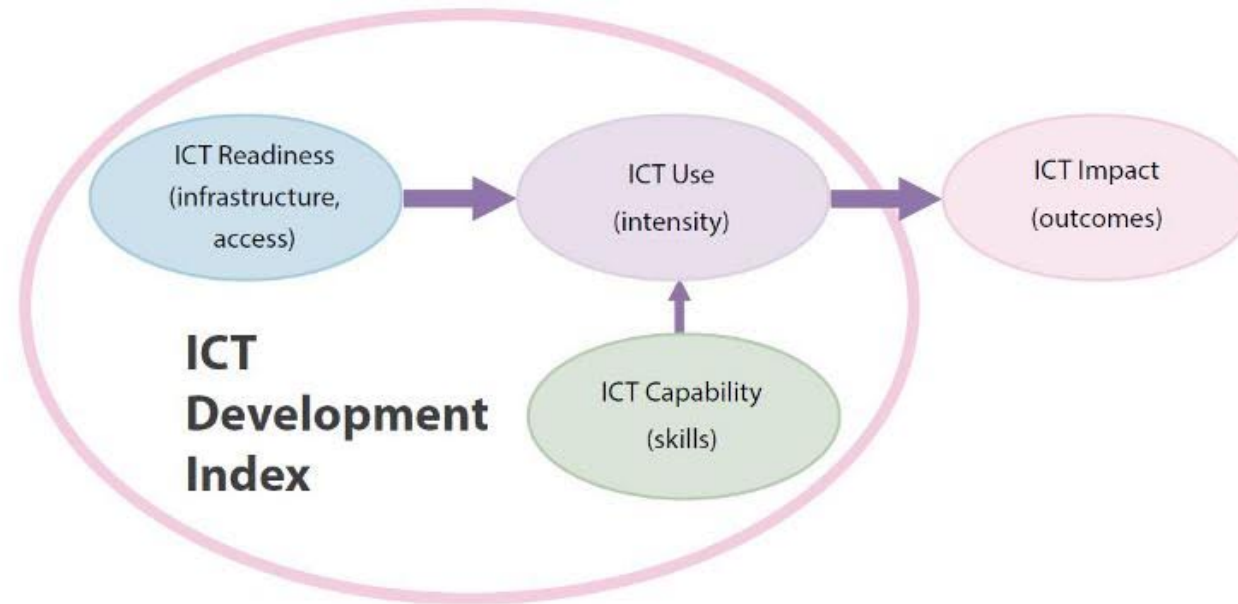
Stage 1: ICT Readiness – reflecting the level of networked infrastructure and access to ICTs

Stage 2: ICT Intensity – reflecting the level of use of ICTs in the society
Stage 3: ICT Impact – reflecting the results/outcomes of more efficient and effective ICT use

ITU WORK IN CAPACITY BUILDING

ITU Academy

Design and development of innovative training programmes and resources in ICTs

Delivery of ICT training activities through multiple channels

- Online through the ITU Academy platform
- Face-to-face through Centres of Excellence and other partners

Platform for dialogue and knowledge sharing

- Global ICT Capacity Building Symposium (CBS)
- Regional events

Strategic partnerships with key players in the field of ICT training

- 32 Centres of Excellence around the globe, Internet Training Centres, private sector companies and academic institutions.

Development of training materials

- Holistic training programmes developed/under development

  - Spectrum Management Training Programme (SMTP)
  - Quality of Service Training Programme (QoSTP)
  - ICT & Climate Change Training Programme (ICT&CCTP)
  - Internet of Things (IoT)
  - Internet Governance

Development of training materials

- Short courses developed
    - Smart and sustainable cities
    - Accessibility
    - IPV6, IPv6 and Internet Infrastructure Security (with APNIC)
    - Satellite network registration procedures
    - Strategic cost modelling in a Quadplay environment
    - E-applications strategy development

- Existing training materials are also being aligned to ITU Academy quality standards
    - Conformance and Interoperability

Delivery of training programmes

ITU has developed high-quality, peer-reviewed training programmes in core ICT areas:

SMTP
SPECTRUM MANAGEMENT TRAINING PROGRAMME
AN ITU ACADEMY INITIATIVE

QUALITY OF
SERVICE
TRAINING PROGRAMME
An ITU Academy Initiative

ICT and Climate Change
Training Programme

Call for partners to deliver training programmes
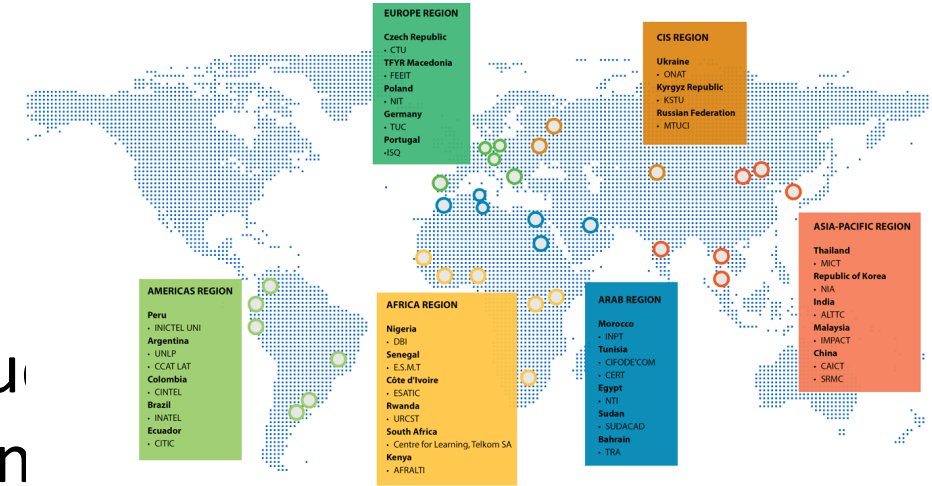
Contact hcbmail@itu.int

Accreditation of SMTP

❑ Awarded by the Central Evaluation and Accreditation Agency (ZEvA), a member of the European Association for Quality Assurance in Higher Education.

❑ SMTP can be aligned to Master's degree programmes internationally, making it easier for Universities to adopt the programme.

❑ The ZEvA panel of experts concluded that all SMTP modules correspond to Level 7 of the European Qualification Framework for lifelong learning.

❑ This will promote flexible study options and provide students with an opportunity to acquire an academic qualification in the specialized field of spectrum management.

Delivery of training programs

- Delivery of training is one of the core functions undertaken under the umbrella of the ITU Academy.

- Training is delivered through various channels, such as Centres of Excellence and other partner training providers

- CoEs deliver face-to-face and e-learning training to ICT professionals and executives in the public and private spheres

- CoE networks established in Africa, the Americas, Arab States, Asia-Pacific, CIS and Europe

EUROPE REGION

Czech Republic
- CTU

TFYR Macedonia
- FEEIT

Poland
- NIT

Germany
- TUC

Portugal
- ISQ

CIS REGION

Ukraine
- ONAT

Kyrgyz Republic
- KSTU

Russian Federation
- MTUCI

ASIA-PACIFIC REGION

Thailand
- MICT

Republic of Korea
- NIA

India
- ALTTC

Malaysia
- IMPACT

China
- CAICT
- SRMC

AMERICAS REGION

Peru
- INICTEL UNI

Argentina
- UNLP
- CCAT LAT

Colombia
- CINTEL

Brazil
- INATEL

Ecuador
- CITIC

AFRICA REGION

Nigeria
- DBI

Senegal
- E.S.M.T

Côte d'Ivoire
- ESATIC

Rwanda
- URCST

South Africa
- Centre for Learning, Telkom SA

Kenya
- AFRALTI

ARAB REGION

Morocco
- INPT

Tunisia
- CIFODE'COM
- CERT

Egypt
- NTI

Sudan
- SUDACAD

Bahrain
- TRA

ITU Academy Platform

- With over 10'000 users from over 130 countries, the ITU Academy platform equips participants with relevant skills in the digital world.

- Topics are ranging from broadband access, spectrum management and IoT to cybersecurity, Internet governance and digital services.

- Courses are delivered in several modalities: face-to-face, online and blended.

Visit the ITU Academy training catalogue: https://academy.itu.int
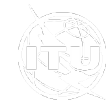
ITU Publication "Capacity Building in a Changing ICT Environment"

- ❑ Online publication launched in 2017

- ❑ Puts together scholarly articles with a focus on the human and institutional aspects of capacity building in the ICT sector

- ❑ **First issue (2017)** focuses on mobile technologies for skills development and lifelong learning

- ❑ **Second issue (2018)**

  - ❑ Focuses on the digital transformation and its impact on skills development

Capacity Building
in a Changing
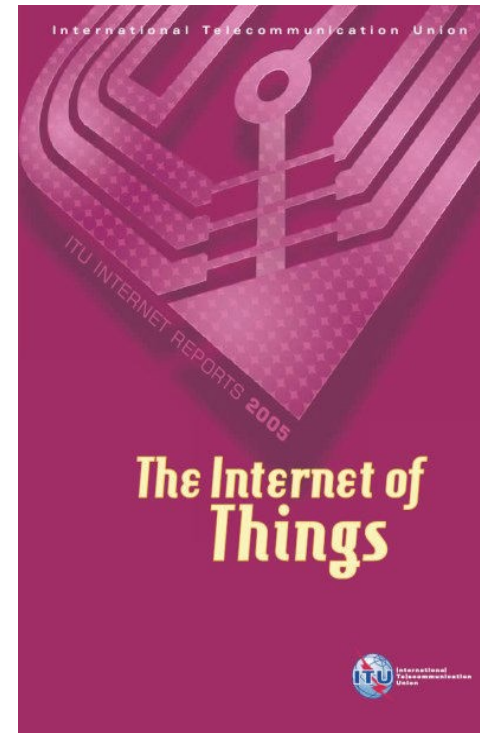ICT Environment
2017
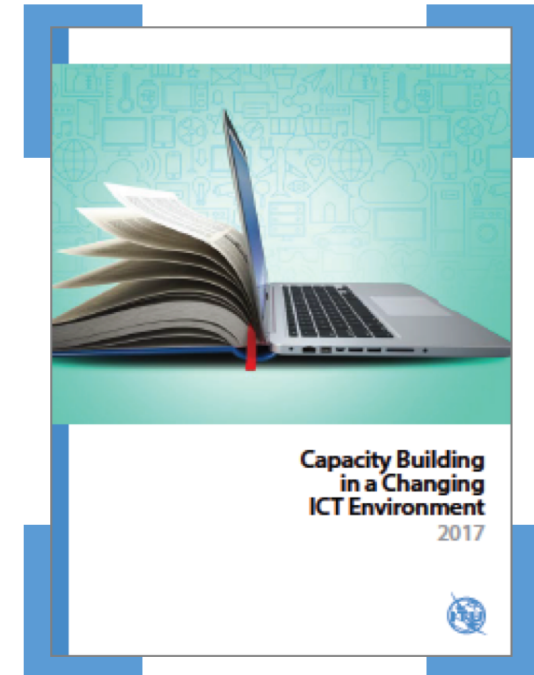
Available at **academy.itu.int**

BUILDING CAPACITY IN

IOT

FULLY connected Society – Concept

Full connectivity describes the increasing digital interconnection of people and things – connectivity *anywhere*, *anytime*, by *anyone* and *anything*.

The Internet of Things
ITU, 2005

ITU-T Study Group 20

☐ On Internet of Things and smart cities and communities

☐ Created in June 2015

☐ Develops international standards aimed at implementing IoT and smart cities and communities;

☐ Promotes interoperability and transparency

ITU- WORK through Study Groups

FROM TECHNOLOGY STANDARDS TO PROJECTS AND DEVELOPMENT INITIATIVES

Technology Standards	Development Initiatives, Programmes and Projects	
▪ SG17 → Security and privacy protection aspects of IoT)	Security	• SG2 Question 3/2: securing information and communication networks; best practices for developing a culture of cybersecurity • Output 3.1 on building confidence and security in the use of ICTs: Regional initiatives on building confidence security in use of tel/IC
▪ SG13 → Focus on Network Aspects of IoT ▪ SG15 → Smart Grids, Home Networks	Networks	• Output 2.2 on Telecomms/ICT networks • SG7 Question 1/1: Policy, regulatory aspects of migration from existing networks to broadband networks in developing countries, including NGN.
▪ Focus Group on Smart Sustainable Cities (FG SSC) (since 02/2013) ▪ Focus Group on Smart Water Management	Capacity Building on Smart Sustainable Cities	• Regional Initiatives on Smart cities

ITU-T standards and Publications

- Recommendation ITU-T Y.2060: Overview of the Internet of things (IoT), 2012, http://www.itu.int/ITU-T/recommendations/rec.aspx?rec=y.2060

- Unleashing the potential of the Internet of Things, 2016, https://www.itu.int/pub/T-TUT-SMARTCITY-2016-2

- Recommendation ITU-T Y.2063, Framework of the web of things, 2012, https://Rwww.itu.int/rec/T-REC-Y.2063/en

- Internet of Things Global Standards Initiative, 2015, http://www.itu.int/en/ITU-T/gsi/iot/Pages/default.aspx

- Shaping smarter and more sustainable cities: Striving for sustainable development goals, 2016, http://wftp3.itu.int/pub/epub_shared/TSB/ITUT-Tech-Report-Specs/2016/en/flipviewerxpress.html

- WTSA Resolution 98 – Enhancing the standardization of Internet of things and smart cities and communities for global development, 2016, https://www.itu.int/dms_pub/itu-t/opb/res/T-RES-T.98-2016-PDF-E.pdf

- Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The Case of Dubai, 2016, http://www.itu.int/en/publications/Documents/tsb/2016-DubaiCase/index.html

ITU-T standards and Publications

- United for Smart Sustainable Cities: Striving for Sustainable Development Goals, 2016, http://wftp3.itu.int/pub/epub_shared/TSB/2016-ITUT-SSC-Brochure/en/index.html#p=1

- Joint Coordination Activity on Internet of Things and Smart Cities and Communities (JCA-IoT and SC&C), available online: http://www.itu.int/en/ITU-T/jca/iot/Pages/default.aspx

- ITU-T SG20: IoT and smart cities and communities (SC&C), available online: https://www.itu.int/en/ITU-T/studygroups/2017-2020/20/Pages/default.aspx

Internet of Things Training Programme (IoTTP)

Problem Statement

☐ There is dramatic growth of IoT due to:

- Widepsread adoption of IP

- Ubiquititous connectivity

- Miniaturization

- Rise of cloud computing

- Advances in data analytics

☐ This technology has potential to change the world even more than the internet did

☐ There is a need to develop experts that are able to plan design and maintain IoT systems

☐ special focus on applications, and adopting a problem-solving methodology.

IoTTP: STRUCTURE

9 Foundation Modules

- ☐ OM: Overview Module

- ☐ FM1: Introduction to the Internet of Things

- ☐ FM2: Standards, Architectures and Interoperability

- ☐ FM3: Policies and Regulations Pertaining to the IoT

- ☐ FM4: Design & Functioning of Wireless IoT Technologies

- ☐ FM5: Physical IoT Infrastructure and Network Planning: from Devices to Cloud

- ☐ FM6: IoT Data Security, Privacy and Trust

- ☐ FM7: Introduction to IoT Data Science

- ☐ FM8: Global IoT Use Cases

IoTTP: STRUCTURE

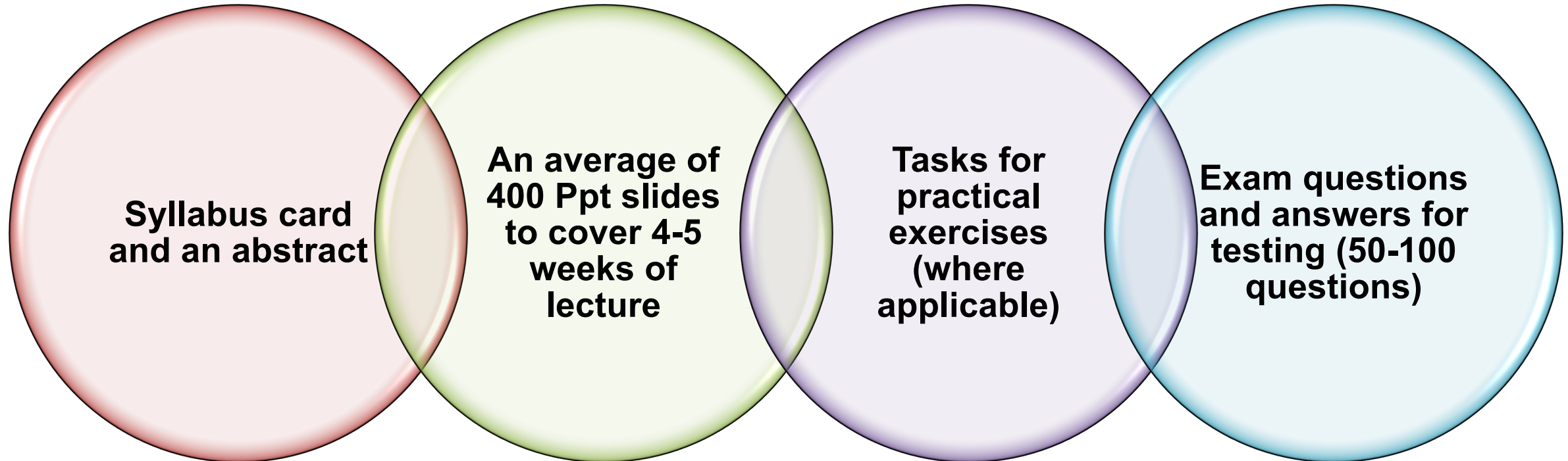**7 Advanced Modules**

- ☐ AM1: Understanding & Designing Sensor Electronics
- ☐ AM2: Advanced Wireless IoT Design in 5G
- ☐ AM3: Designing & Programming of the Web of Things
- ☐ AM4: AI and Machine Learning for IoT Big Data
- ☐ AM5: Social & Ethical Implications and Case Studies
- ☐ AM6: Business Models and Case Study Implementations
- ☐ AM7: IoT Entrepreneurship

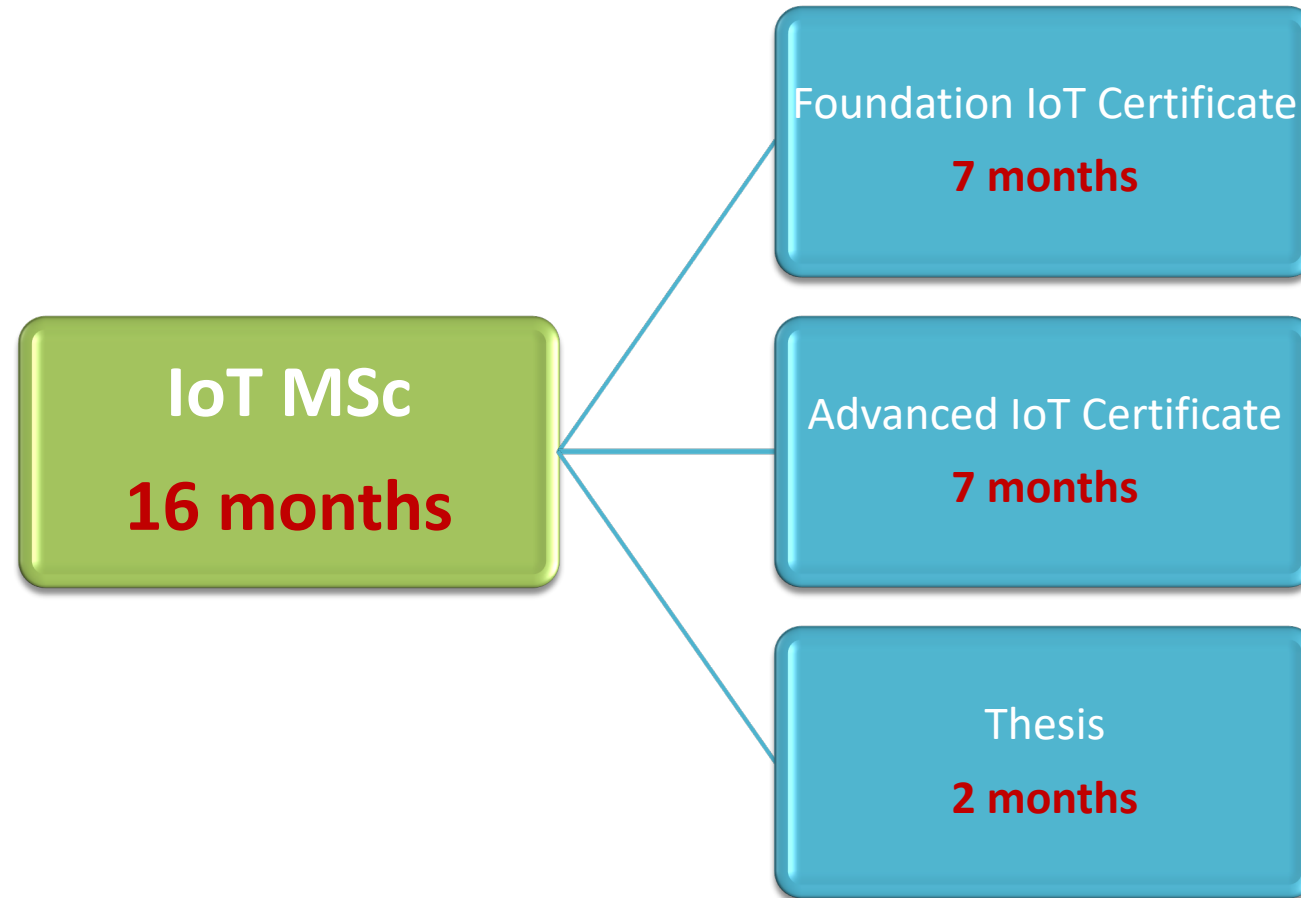# IoTTP: COMPOSITION

Each Module will Consist of:

Syllabus card and an abstract

An average of 400 Ppt slides to cover 4-5 weeks of lecture

Tasks for practical exercises (where applicable)

Exam questions and answers for testing (50-100 questions)

IoTTP: Delivery times

Time required to complete each part of the IoTTP:

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                    ┌─────────────────────────────┐
                    │  Foundation IoT Certificate  │
                    │        7 months              │
                    └─────────────────────────────┘

┌──────────────┐    ┌─────────────────────────────┐
│   IoT MSc    │    │  Advanced IoT Certificate    │
│              │────│        7 months              │
│  16 months   │    └─────────────────────────────┘
└──────────────┘
                    ┌─────────────────────────────┐
                    │           Thesis             │
                    │         2 months             │
                    └─────────────────────────────┘
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IoTTP: Delivery modes

Foundational modules

- Face to face
- Classroom driven

Advanced Modules

- E-learning
- Real-time web based seminars
- Instructor led self-study

IoTTP Certification Routes

ASSESSMENT

Advanced IoT Certificate

Understanding and Designing Sensor Electronics

Advanced Wireless IoT Design in 5G

Designing and Programming of the Web of Things

AI and Machine Learning for IoT Big Data

Social and Ethical Implications and Case Studies

Business Models and Case Study Implementations

IoT Entrepreneurship

AT LEAST FOUR ADVANCED MODULES

Advanced IoT Certificate

MASTER THESIS

Internet of Things MSc

Where are we now?

- Started Peer review
- Finalization of Modular development
- Editing of Program
- Pilot testing
- Ready for market

Next Steps

- ☐ Complete the development of training materials

- ☐ Engage training providers for partnerships in the delivery of the training

- ☐ Convert material to multimedia

CoE Priorities for the 2019-2022 Cycle

Spectrum management	Smart cities and communities
Bridging the standardization gap	Artificial intelligence
Digital broadcasting	Digital financial services
Conformance and interoperability	Internet governance
Internet of Things	Innovation and entrepreneurship
Cybersecurity	ICTs and the environment
Digital inclusion	Digital transformation
Emergency telecommunication	Digital economy
ICT applications	Big data and statistics
Wireless and fixed broadband	

IoT Training Activities

- Training activities being run through Centres of Excellence
- Regional Forums on IoT.
- Global Forum for Academia on building Digitasl Skills(2017)
- Global Forum 2018

IoT workshop in Thailand (Dec 2017)

IoT regional Activities

- Regional Workshop for Africa: 28-30 June 2017, Mauritius

  Developing the ICT ecosystem to harness Internet-of-Things (IoT)

- Policy makers, regulators, service providers and academia involved in Internet of Things.

- 151 participants: (90 Mauritians and 61 foreign delegates)

- CEOs, IT Managers/Engineers, policy makers, telecommunication Engineers/ ICT Regulators, University Lecturers and Professionals from Key Economic Sectors.

Topics covered

- Internet of Things (IoTs) – A technical overview of the ecosystem
- Internet of Things – Policy and regulatory enablers
- IOT: Application and services and ITU-T Standards
- IOT: Application and services
- IOT Technical planning: Network planning
- IOT: Solutions and deployment experiences
- : IOT: Business Models and Opportunities

ITU-ACADEMIA PARTNERSHIP MEETING

Developing skills for the digital era

Held from 19-21 September 2017, Budapest, Hungary

Brings together universities that have an interest in the topic of ICT to:

☐ discuss emerging technology trends and their impact on academic programmes

☐ share latest developments in teaching and learning in the digital era

☐ examine approaches towards building skills for a 21st century workforce.

Aims to identify ways to **strengthen collaboration** between ITU and the academic community in developing capacities for the digital future.

Activities in IoT

- Internet of Things: Overview and Applications, E-learning, Asia-Pacific,
  23 April – 20 May, 2018

- ICT Role for Smart Sustainable Cities, E-learning, Americas,
  14 May-15 June, 2018

- Regulatory Aspects of 5G, IoT, m-Payment Emerging Technologies and Eco-Systems, E-Learning, Arab Region, 16-25 September, 2018

- Ingénierie et planification des réseaux IoT et applications, Workshop, Dakar, Senegal, Africa, 9-13 July, 2018

For more information on workshops and e-learning courses please visit our online catalogue:
https://academy.itu.int/index.php?option=com_joomdle&view=coursescatalogdomain&Itemid=478&lang=en

GLOBAL ICT CAPACITY BUILDING SYMPOSIUM (CBS 2018) 18-20 JUNE 2018

☐ Topics:

- ❑ Digital transformation
- ❑ SDGs and inclusive digital society
- ❑ Role of academic institutions
- ❑ Capacity building implications for LDCs, SIDS & LLDCs
- ❑ Core skills for the digital economy
- ❑ Innovation and entrepreneurship

☐ Participants:

- ❑ Governments
- ❑ private companies
- ❑ academic institutions
- ❑ international agencies
- ❑ other experts in the field

Conclusion

- Capacity building in ICT has become more important than ever before because of the transformative nature of the digital economy and society

- Every level in society needs capacity building. It just differs in scope.

- We need to raise awareness of the future impact of a connected world on our economies, our societies, our lives.

- We need partners to join us in building this capacity. From Private sector, development Agencies, Governments and Academia

QUESTIONS?

For more information please contact

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or visit

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