The 5G Network Security

Telecom Engineering
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Introduction

5G has the potential to make the world much more connected. Devices in locations without access to traditional broadband networks can be deployed using 5G network connectivity. Higher speeds, lower latency, and increased capacity also make it a potential option for devices where 4G LTE was not a viable option. However, with this growth in systems connected to 5G networks also comes potential security implications. Businesses deploying 5G-connected devices need security solutions capable of monitoring and securing them against cyber threats.

5G Network Security Training course presents old and new threats, security aspects, requirements, and recommendations from various organizations, and then the new, improved functions and procedures designed to improve the security of the future 5G networks for communication with regular users and a growing number of IoT devices.

Course Objectives of The 5G Network Security

- Describe typical mobile access authentication methods
- Describe the 5G enablers
- Understand the Novel technologies for 5G security
- Describe the WBPLSec system model
- Describe LiFi technology
- Describe Software Defined Monitoring architecture
- Understand IoT security requirements
- Understand security issues surrounding positioning technologies
- Understand customer edge security issues
- Understand the security issues within the MVNO environments
- Understand security surrounding Mobile Cloud

The 5G Network Security Course Outlines

Day 1
Introduction to 5G Networks and Systems

- 5G 101
- 5G Communications Overview
- Channels and Carriers

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- Channelization
- 5G Access Techniques

Day 2
5G Services

- Broadcasting, Mobile and Fixed 5G Service
- 5G communications systems engineering principals
- Service and Performance Requirements
- 5G New Radio NR
- 5G NR FDD/TDD CA
- Non-Standalone NSA
- Standalone SA
- Evolution of cellular systems

Day 3
Cellular Ssystem Generations

- Second-generation cellular systems
- Third generation cellular systems
- Fourth generation cellular systems
- 5G Mobile networks
- 5G requirements
- 5G enabling technologies
- 5G standardisation activities
- Mobile networks security landscape
- Mobile security lifecycle functions
- Design principles for 5G security
- Overview of security recommendations and challenges
- Novel technologies for 5G security
- Security in SDN-based mobile networks
- Cyber security business models in 5G
- The context of cyber security businesses
- The business model approach
- The business case of cyber security in the 5G era
- Business model options in 5G security

Day 4
5G Network Security

- Physical layer security
- WBPLSec system model
- Outage probability of secrecy capacity of a jamming receiver
- WBPLSec applied to 5G
- 5G-WLAN security
- Introduction to WiFi-5G network interoperability
- Overview of network architecture for WiFi-5G network interoperability
- 5G-WiFi security challenges

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- Security consideration for architectural design of WiFi-5G networks
- LiFi networks

Day 5
Introduction to LiFi-5G network interoperability

- 5G-LiFi security challenges
- Security consideration for architectural design of LiFi-5G networks
- Safety of 5G network physical infrastructures
- Historical development
- Structural design philosophy
- Survey of problems
- Opportunities and recommendations
- Customer Edge Switching
- State-of-the-Art in Mobile Networks Security
- CES Security Framework
- Evaluation of CES Security

Day 6
Deployment in 5G Networks

- Software Defined Security Monitoring in 5G Networks
- Existing Monitoring Techniques
- Limitations of Current Monitoring Techniques
- Use of Monitoring in 5G
- Software Defined Monitoring Architecture
- Expected Advantages of Software Defined Monitoring
- Expected Challenges in Software Defined Monitoring

Day 7
5G Device and User Security

- IoT Security
- Literature Overview and Research Motivations
- Distributed Security Platform
- Mobile Cloud Robot Security Scenarios
- User Privacy, identity & Trust in 5G
- Background
- User Privacy
- Identity Management

Day 8
Trust Models

- 5G Positioning
- Outdoor versus Indoor Positioning Technologies
- Passive versus Active Positioning
- Overview of 5G Positioning Mechanisms

- Main Privacy Concerns
- Passive versus Active Positioning Concepts
- Physical Layer-based Security Enhancement Mechanisms for Positioning
- Enhancing Trustworthiness
- Cryptographic Techniques for Security and Privacy in 5G
- Landscape of the European and International Projects related to Secure Positioning

Day 9
5G Cloud and Virtual Network Security

- Mobile Virtual Network Operators MVNO Security
- Cloudification of the Network Operators
- MVNO Security
- TaaS Deployment Security
- Future Directions
- NFV and NFV-based Security Services
- 5G, NFV and Security
- A Brief introduction to NFV
- NFV, SDN and a Telco Cloud
- Common NFV Drivers
- NFV Security: Challenges and Opportunities
- NFV-based Security Services
- Cloud and MEC Security
- Cloud Computing in 5G Networks

Day 10
MEC in 5G Networks

- Security Challenges in 5G Cloud
- Security Challenges in 5G MEC
- Security Architecture for 5G Cloud and MEC
- 5G MEC, Cloud Security Research and Standardisation
- Regulatory Impact on 5G Security and Privacy
- Regulatory Objectives for Security and Privacy
- Legal Framework for Security and Privacy
- Security and Privacy Issues in New 5G Technologies
- Relevance Assessment of Security and Privacy Issues for Regulation
- Analysis of Potential Regulatory Approaches
- Summary of Issues and Impact of New Technologies on Security and Privacy Regulations

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