Nokia Bell Labs
5G Certification

NokiaEDU
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Nokia Bell Labs 5G Certification Program
Overview

We are on the cusp of Industry 4.0
• Opportunity: capture the new value and revenue opportunity promised by 5G

Technology and business solutions are moving fast
• Look ahead, and plan from the future back

User demands are increasingly real-time
• End-to-end solutions need to enable this new reality
• Understanding of end-to-end solutions, and how they work, is needed

Bell Labs 5G Certification: designed to address this industry knowledge need

Certification validates substance and rigor
• Generate real business value for industry players
• Add tangible value to an individual’s career
A blueprint to a deeply interconnected future

- **Digital Value Platforms**
  - External data sources

- **Augmented Cognition Systems**

- **Programmable Network OS**

- **Universal Adaptive Core**
  - Self-optimized coverage & capacity

- **Smart Network Fabric**
  - Access agnostic converged core
  - Modular, decomposed network functions

- **Dynamic customer services**
  - Management & Orchestration
  - Dynamic network optimization
  - Multi-operator federation

- **Dynamic Data Security**
  - New trust framework
  - Ecosystem sharing
  - Mass edge monitoring

- **Emerging Devices & Sensors**
  - Massive scale access

- **Converged Edge Cloud**
  - Software defined, end-end

- **Long fibers**
  - Short waves & wires

- **Access Remote**

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How will this program help you?
The 5G Certification program is designed to provide specific competencies for your current and future roles

**Individual learners**
- Students
- Industry Job Seekers
- Business Professionals & Executives

**Industry players**
Know-how to enhance business performance and employee development

**Service providers**
Insights and knowledge of emerging 5G solutions, for an edge in the market
### Program Description

<table>
<thead>
<tr>
<th>Certification Levels</th>
<th>Audience</th>
<th>Focus</th>
<th>Delivery</th>
<th>Certifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Associate</td>
<td>• Independent, vendor-agnostic content – relevant for all</td>
<td>• Strategy and planning</td>
<td>• Emphasis on self-paced training for maximum convenience</td>
<td>• Awarded by passing knowledge-based exams</td>
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<td>• Professional</td>
<td>• Applied technology for new business value creation</td>
<td>• End-to-end network capabilities</td>
<td>• Instructor-led sessions</td>
<td>• Externally proctored</td>
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</tbody>
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**Nokia Bell Labs**

**5G Certification Associate**

Available now

The Associate level Certification provides a basic level understanding of the key business issues, fundamental principles and technical pillars of 5G. It is ideal for learners needing to understand and apply foundational knowledge of 5G.

**Nokia Bell Labs**

**5G Certification Professional**

2020 rollout

The Professional level Certification covers 5 different domains: Networking, Cloud, Slicing, Security & Industrial Automation. Learners can earn their professional certifications in any or all of the domains.

[www.nokia.com/networks/training/5g/bell-labs/](http://www.nokia.com/networks/training/5g/bell-labs/)
Nokia Bell Labs 5G Certification Program

Nokia Bell Labs 5G Foundation Course

- The 5G Imperative
- Foundation of 5G Networking
- Foundation of Distributed Cloud
- Foundation of Network Slicing
- Foundation of Security
- Foundation of Industrial Automation

Nokia Bell Labs 5G Associate Examination

Individual End-to-End 5G Professional Courses

- Networking
- Distributed Cloud Networks
- Network Slicing
- Secure Networks
- Industrial Automation Networks

Individual 5G Professional Certification Examinations
### Foundation course overview

#### Learning Objectives

- Apply your understanding of key business issues, fundamental principles and technical pillars of 5G needed to engage in and contribute to various 5G strategy and planning initiatives.
- Recognize the importance of a future-back approach.
- Better understand the technologies that enable and support 5G evolution.
- Apply your knowledge of 5G for the purpose of strategy and planning, and the creation of new business value.
- Critically review the leading industry trends and use cases to be able to expand your capabilities to discuss them with ease.

<table>
<thead>
<tr>
<th>Unit 1: The 5G Imperative</th>
<th>Unit 2: Foundation of 5G Networking</th>
<th>Unit 3: Foundation of Distributed Cloud</th>
</tr>
</thead>
</table>
| 5G drivers and technology essentials | Access, Core, Transport:  
- Requirements  
- Key technology enablers  
- New architecture | Requirements of 5G distributed cloud  
- Key technology architecture and enablers  
- Benefits of distributed cloud |

<table>
<thead>
<tr>
<th>Unit 4: Foundation of Network Slicing</th>
<th>Unit 5: Foundation of Security</th>
<th>Unit 6: Foundation of Industrial Automation</th>
</tr>
</thead>
</table>
| Essential requirements and principals underlying network slicing  
- Slicing architecture and enablers  
- Benefits of slicing automation | 5G security requirements  
- 5G security standards and enablers  
- 5G security architecture | Requirements of Industry 4.0  
- Lead-up to effective industrial automation  
- 5G-enabled uses cases  
- Value of use cases to various industries |
Appendix
Learning Objectives

UNIT 1

5G Drivers & Technology Essentials
- Discriminate among the limits in consumer value creation, current networks, and total cost of ownership (TCO) that are driving the need for an end-to-end approach in 5G.
- Explore the business trends and technology evolution that create the new opportunities associated with Industry 4.0.
- Evaluate the importance of new automated solutions.

Industry Journey to E2E 5G
- Ascertain which are the key industries that will capitalize on 5G today and tomorrow.
- Explore how 5G performance capabilities of extreme throughput, ultra low latency, improved reliability and massive connectivity are enabling new value creation for those industries.
- Consider the industry example that will be used for exercises throughout the course.

UNIT 2

Foundation of 5G Networking - Access
- Express how access is evolving in the 5G era to provide the capacity, latency, reliability and connectivity needed for emerging business applications.
- Evaluate 5G access in light of the continuing evolution of fiber, cable, copper and WiFi technologies.
- Articulate the fundamentals of the underlying technology and architecture of 5G access.

Foundation of 5G Networking - Core
- Evaluate the limitation of core today, and how it must adapt for the evolution of 5G networks.
- Analyze the technology concepts that enable the core to be both universal and adaptive for 5G.
- Examine the main functions a universal and adaptive core will deliver in an 5G network.
- Depict how the universal adaptive core is evolving to address 5G enterprise, industrial and convergence needs.

Foundation of 5G Networking - Transport
- Explain how the transport network will meet the scalability, reliability, flexibility and efficiency needs of 5G.
- Map the key transport technology enablers that will drive capacity, flexibility, optimization, traffic management and slicing SLAs in the 5G transport network.
- Describe the overall architecture of a 5G transport network.
- Understand how a flexible and scalable transport network enables the business potential of 5G.

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• Explain how the transport network will meet the scalability, reliability, flexibility and efficiency needs of 5G.
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• Describe the overall architecture of a 5G transport network.
• Understand how a flexible and scalable transport network enables the business potential of 5G.
### Foundation of Distributed Cloud
- Describe how a distributed cloud is an essential element for 5G delivery of low-latency services and applications.
- Understand the strategic benefit of distributed clouds in support of dense 5G RAN deployments, local low-latency services and network slicing.
- Map how edge clouds fit as part of a distributed cloud environment, especially for industry players needing to enable low-latency, on-site services.
- Understand the relevant deployment options to consider in planning distributed cloud for 5G.
- Consider the strategic hardware and software technology decisions and investments needed to enable service delivery from distributed cloud.

### Foundation of Network Slicing
- Understand the origin and basic technical details of the concept of network slicing.
- Be familiar with the concept of 5G end-to-end QoS/SLA, and how slicing delivers these concepts in a 5G network.
- Explain examples of technical and economic benefits from network slicing.
- Understand why network slicing requirements are a paramount driver of 5G networks.

### Foundation of Security
- Identify the security requirements for 5G.
- Recognize the security measures needed in 5G.
- List examples of potential attack vectors on a 5G network.
- List the main 3GPP 5G security features.
- List the main cloud, NFV and network slicing security principles.
- Understand the need of integrated and automated AI/ML based security solution for holistic and efficient 5G security.

### Foundation of Industrial Automation
- Describe how the intersection of operational, information and communications technologies is driving new value creation in industrial automation.
- Articulate the role 5G is playing in meeting the automation needs of Industry 4.0.
- Map 5G-enabled horizontal applications to the business needs and technology performance requirements of industry.
- Describe how these 5G-enabled horizontal applications apply to specific use-cases in the public safety, transportation and manufacturing industries.
- Apply your knowledge from the course to the business challenges and initiatives of the Port of Hamburg, and your own business environment.