Course Outline of Operationalizing Cisco 5G Solutions

Module 1: Introduction

- Standardization of 5G-Evolution from 1G to 5G
- ITU-R Vision for 5G
- Use Case-Enhanced Mobile Broadband Vs Standalone Architectures

Module 2: Moving from 4G to 5G-None-standalone vs Standalone Architectures

- Introduction to 5G Architecture
- 5G Deployment Options-Standalone vs Non-Standalone Architectures

Module 3: Key Technologies of 5G New Radio (NR)

- Dual Connectivity in 5G Networks
- Small Cells with Dual Connectivity in 5G
- Increased Wireless Spectrum of 5G And Its Properties
- OFDMA, Flexible Numerology and Frame Structure in 5G
- Resource Block and Resource Element
- 256 QAM As Modulation Technique In 5G Networks
- Cloud Radio Access Network (CRAN) in 5G Networks

Module 4: Massive MIMO and Beam-forming in 5G

- Introduction
- Antennas For mmWave
- How 3D Beamforming Works
- 5G Antennas for massive MIMO

Module 5: Network Architecture

- Next Generation NodeB (gNB) functions in NG-RAN
- Packet Data Unit (PDU) session
- What is Meant by Control Plane and User Plane separation?

Module 6: 5G Network Architecture-Core Network

- Access and Mobility Management Functions (AMF)
- Authentication Server Function (AUSF)
- Session Management Function (SMF)
- User Plane Function (UPF)
- Unified Data Management (UDM)

- Policy Charging Function (PCF)
- Application Function (AF)

Module 7: Network Function Virtualization and Network Slicing

- Network Function Virtualization (NFV)
- Network Slicing

Module 8: Remaining Function of 5G Core Network

- Network Repository Function (NRF)
- Network Slice Selection Function (NSSF)
- Network Exposure Function (NEF)

Module 9: Identifiers in 5G

- UE Identifiers-PEI, SUPI, SUCI, 5G-S-TMSI, 5G-GUTI
- Tracking Areas in 5G
- 5G Network Identifiers

Module 10: Procedures in 5G Networks

- UE Power-On and Registration
- UE Idle and Connected Modes
- PDU Session Establishment
- UE Paging Procedure
- Tracking Area Update procedures
- Handover and Its Types In 5G

Module 11: Transport Architectures for 5G RAN

- Location Flexibility
- Mapping 5G RAN to Transport Networks
- Service Layer
  - Mobile Network
    - RU
    - DU
    - CU
    - 5GC
    - Front-haul, mid-haul, back-haul
  - Fixed Transport Network
- Mapping Functional Nodes to the Physical Network
- Time Sensitive Networking

Module 12: Interworking with 4G

- Cisco core network solution evolution
- Voice and IMS options in 5G SA
- EPC vs 5GC

Module 13: Cisco's Cloud based approach to 5G

- 5G converged SDN transport Architecture
- Segment routing
- Cloud RAN
- Service Provider Automation portfolio
- Security First mobile transport
- Open vRAN
- Multi-Access Edge Computing (MEC)
- Cisco Ultra Service Platform

Module 14: WI-FI 6

- What is WI-FI 6?
- How does WI-FI 6 differ from 802.11ax
- Components of WI-FI 6
    - Denser modulation using 1024 Quadrature Amplitude Modulation (QAM)
    - Orthogonal Frequency Division Multiple Access (OFDMA)-based scheduling to reduce overhead and latency.
    - Robust high efficiency signaling for better operation at a significantly lower Received Signal Strength Indication (RSSI).
    - Better scheduling and longer device battery life with Target Wake Time (TWT)

Module 15: 5G and WI-FI 6 Co-exiting

- Cisco Open Roaming
- The New Standard
- Open Roaming Technology Pillars
    - Passpoint
    - WRIX
    - HSP Network Endpoints
- Open Roaming Network Deployment Architecture
- RCOI and Policy Implementation
- QoS Types and Service Level
    - Baseline QoS
    - Silver QoS
    - Gold QoS
- RadSec Secured Interconnect

- Dynamic Discover of HSPs/IDPs