Primebit solutions

Module 1: 5G N/W Requirements and Design

- Limitation of 4G and challenges for 5G
- Capacity and higher data rate
- QOE (Quality of Experience)
- Spectrum
- mMIMO(Massive multiple Input –Multiple Output)
- Device to Drive Communication
- Reduced Protocol Overhead
- Hydrogenous cell Architecture
- Network function Visualization

Module 2: 5G Software controlled Architecture

- Software in Radio access Network
- Software in mobile edge network
- Software in transport network
- 5G protocol stack Architecture
- Security in 5G Software Network
- Radio Access protocol in cloud RAN

Module 3: 5G Hardware Network Architecture 5G Cloud RAN

- Network Architecture Evolution from 4G to 5G
- End to End Network slicing
- 5G ---Cloud RAN
  - o   Cloud RAN Advantage
  - o   Advance Cloud RAN Architecture
  - o   Cloud RAN and 5g

o Functional split of Cloud RAN (real time) RT and NRT spilt

o MultiRAT architecture for 4G /5G cloud RAN

o Distributed RAN

o Virtualization RAN

· Fixed Network

o Heterogeneous access domain

o Flexible metro domain

o Integrations of access ,metro core Technologies

Module 4: 5G Data flow channels and channel coding

· Logical Channel

· Transport Channel

· Physical Channel

· UL Mapping Of channels

· DL- mapping of Channels

· Channel coding

· Multiplexing

· Interleaving

Module 5: 5G Physical layer Design

· Frame structure

· Slot structure and physical recourses

· Reference signal

o UE specific reference signal XPDSCH

o UE Specific Reference signal XPDCCH

o CSI reference Signal

o Beam Reference signal

o Demutualization reference signal

· Synchronization signal

- o Primary Synchronization signal
- o Secondary synchronization signal
- o Extended synchronisation signal
- · 5G Modulation
  - o BPSK—16QAM
  - o QPSK—64 QAM

- · Physical channel
  - o Uplink XPUSCH, Uplink XPUCCH, Uplink XPRACH
- · Downlink Physical channel
  - o XPDSCH
  - o XPBCH and Extended PBCH
  - o XPDCC
- · Mapping of channel to resource element

Module 6: Physical Layer Procedure

- · Synchronization procedure
- · Beam Forming Procedure
- · Power Control Procedure
- · Physical Random Access Procedure

Module 7: 5G MAC   Layer Design

- · Comparison of 5G MAC with UMTS and LTE MAC
- · 5G – MAC Architecture
- · 5G –MAC Service
- · 5G – MAC Function
- · Mapping of Transport channel and logical channel

Module 8: 5G MAC layer procedures

· 5G Random Access Procedure

· XDLSCH Data Transfer

· XULSCH Data Transfer

· Beam management

· 5G ---MAC Protocol Data Unit

· 5G---MAC format

· 5G---MAC Parameter

Module 9: 5G RLC Layer Design

· Compare LTE , RLC and 5G RLC

· 5G---RLC Architecture

· Model of 5G-RLC sub layer

· RLC mode

· 5G --RLC service

· 5G –RLC function

· Data available for transmission

Module 10: 5G RLC procedures

· Data transfer Procedure

· ARQ Procedure

· SDU Discard procedure

· Reestablishment Procedure

· 5G—RLC protocol data Unit

· 5G RLC Formats and Parameter

Module 11: 5G PDCP layer design

· Compare 5G PDCP with LTE and UMTS PDCP

· 5G PDCP Architecture

· 5G PDCP Service

· 5G Function

· Data Available for Transmissions

Module 12: 5G PDCP layer Procedure

· 5G PDCP Data Transfer procedure

· 5G PDCP States Report

· 5G PDCP Discard

· Ciphering and Deciphering

· Integrity Protection and Verification

· 5G PDCP Protocol data Unit

· 5G PDCP Format

· 5G PDCP Parameters

Module 13: RRC layer Design

· RRC layer Architecture

· RRC States

· Signalling radio bearers

· 5G –RRC services

· 5G—RRC function

Module 14: RRC layer procedures

- Broadcast system information
- RRC connection management
- RRC connection reconfiguration
- RRC connection Reestablishment
- RRC connection release
- RRC measurement procedure
- 5G- RRC Protocol data unit

Module 15: NAS Layer

- Mobility Management
- Session Management function
- 5G-NAS State
- 5G- NAS MM Protocol
- 5G- NAS SM Protocol

Module 16: 5G-Variable, Timer and Constant

- 5G-MAC Variable, timer and constant
- 5G-RLC Variable, timer and constant
- 5G-PDCP Variable, timer and constant
- 5G-RRC Variable, timer and constant

Module 17: 5G-Security design

- 5G Security Network Architecture
- Domains in 5G security
- 5G Security software architecture
- Stratum
- Security control class(SCC)
- Security Realm(SR)
- 5G-Security methods