**HSDPA** is the next step in the evolution of 3GPP UMTS networks. HSDPA offers higher data rates over UMTS networks in downlink. HSDPA introduces required enhancements to 3GPP networks to enhance downlink speeds. This course introduces all the enhancements made in HSDPA to support high data rate applications. In particular, the course covers the following important topics (not exhaustive):

- List the major releases of 3GPP technology and its key features
- Sketch network changes required for implementing HSDPA over existing rel 99 networks
- Describe major concepts of HSDPA and how they can offer higher rates
- List and describe functionalities of different channels in HSDPA
- Describe fast (TDM/CDM) scheduling operation in HSDPA
- Sketch handover operations such as serving cell change in HSDPA
- Describe transition between HSDPA and UMTS
- Identify major deployment challenges for HSDPA
- Discuss major enhancements made to HSDPA beyond Rel 6

At the end of the course, students will be able to describe major features and operations of HSDPA technology.

### Intended Audience

This is an intermediate level course for HSDPA networks. As such, it is suitable for engineering groups in manufacturers and operators. This course is suitable for the following audience:

- R&D groups, system and handset architects and test groups involved in design and development and deployment of HSDPA products
- Deployment Groups in operators interested in understanding the evolution path for their current networks

### Course Outline

**1. 3GPP Evolution**
- 3GPP Releases
- Limitations of Release 99 (UMTS)
- Rationale for HSDPA
- Network Architecture with HSPA
- Peak/Average Throughput

**2. HSDPA Introduction**
- Drivers for HSDPA
- HSDPA backward compatibility issues
- Possible HSDPA data rates
- Scheduled and Non-scheduled transmissions

**3. HSDPA Concepts**
- TDM/CDM Approach
- Achieving higher data rates
- Adaptive Coding and Modulation (AMC)
- Hybrid ARQ
- UE Categories for HSDPA

**4. HSDPA Physical/MAC Layer**
- Physical and Transport channels
- OVSF codes sharing with Rel 99
- Hybrid ARQ operations
- CQI Reporting
- Fast Bandwidth scheduling (TDM/CDM)
- Release 6 enhancements

**5. HSDPA Operations**
- Establishing HSDPA radio bearer
- HSDPA handovers - Serving Cell Change
- State transitions (Cell_DCH to Cell_FACH)
- HSDPA Handovers to/from Rel 99 cells

**6. Deployment Aspects**
- How to upgrade to HSDPA
- Deploying HSDPA and Rel 99 in the same carrier
- Mixed & Greenfield deployment

**7. HSDPA Enhancements**
- Dual Cell HSDPA
- Enhanced Serving Cell Change

### Duration:

1 Day (Instructor led)

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