

## Contents

1. **Introduction to UMTS Networks**
  - Evolution of mobile communications
  - GSM to UMTS transition
  - UMTS architecture and services
2. **UMTS Radio Interface Fundamentals**
  - WCDMA technology principles
  - Air interface structure
  - Spreading, coding, and modulation techniques
3. **UMTS Network Architecture**
  - User Equipment (UE)
  - UTRAN components
  - Node B and Radio Network Controller (RNC)
  - Core Network integration
4. **Radio Propagation and Propagation Models**
  - Propagation mechanisms
  - Path loss models
  - Shadowing and fading effects
  - Urban, suburban, and rural environments
5. **Coverage Planning**
  - Coverage dimensioning
  - Link budget analysis
  - Uplink and downlink planning
  - Cell range estimation
6. **Capacity Planning**
  - Capacity dimensioning principles
  - Traffic modelling
  - Load analysis
  - Interference management
7. **Quality of Service (QoS) in UMTS**
  - QoS requirements
  - Service classes
  - Performance indicators
  - Resource allocation
8. **Radio Network Optimisation**
  - Optimisation strategies
  - Performance monitoring
  - Drive testing methods
  - KPI analysis and troubleshooting
9. **Mobility Management and Handover**
  - Soft handover concepts
  - Mobility procedures
  - Location management
  - Roaming considerations

## **10. Frequency and Parameter Planning**

- Frequency allocation
- Scrambling code planning
- Radio parameter configuration

## **11. Traffic and Performance Analysis**

- Network measurements
- Statistical evaluation
- Bottleneck detection
- Performance enhancement

## **12. Case Studies and Practical Applications**

- Real deployment scenarios
- Planning examples
- Optimisation case studies