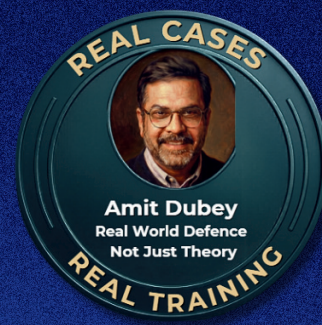




# MODULE 9: ADVANCED CDR ANALYSIS & TELECOM FORENSICS



## Module Objective:

Turn raw CDRs into evidence: interpret CDR fields accurately, clean datasets, map relationships, trace movement using cell tower data, correlate multiple numbers/devices, reconstruct timelines, and present findings in a court-ready format.

## Curriculum

### SEGMENT 9.1 Introduction to Telecom Networks

#### Topics:

- GSM, CDMA, LTE, 5G overview
- SIM, IMEI, IMSI concepts
- HLR, VLR, MSC, GMSC
- Call routing process
- Roaming mechanism

### SEGMENT 9.2 Understanding CDR Structure

#### Topics:

- What is a CDR
- Mandatory fields
- Calling number
- Called number
- Date & time
- Call duration
- Cell ID
- LAC / TAC
- IMEI / IMSI
- Call type
- SMS & Data session records
- Incoming vs outgoing logic

### SEGMENT 9.3 CDR Data Cleaning & Preparation

#### Topics:

- Data formats (CSV, Excel, PDF)
- Normalization techniques
- Removing duplicates
- Timestamp corrections
- Time-zone adjustment
- Handling missing fields

### SEGMENT 9.4 Call Pattern Analysis

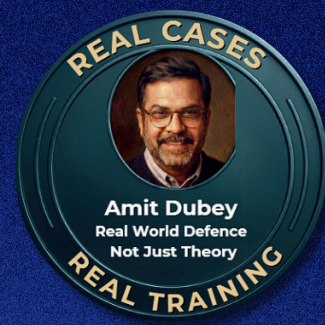
#### Topics:

- Frequency analysis
- Peak calling hours
- Short call patterns
- Silent call detection
- Burner phone indicators
- Call clustering
- Recurring contacts





# MODULE 9: ADVANCED CDR ANALYSIS & TELECOM FORENSICS



## SEGMENT 9.5 Relationship & Network Mapping

### Topics:

- Primary and secondary contacts
- Link analysis
- Social network graphs
- Common contact identification
- Group communication patterns
- Hierarchy inference

## SEGMENT 9.6 Location & Movement Analysis

### Topics:

- Cell tower basics
- Cell ID to location mapping
- Sector orientation
- Coverage radius estimation
- Travel route reconstruction
- Alibi verification
- Co-location analysis
- Geofence interpretation

## SEGMENT 9.7 Multi-Number & Device Correlation

### Topics:

- IMEI correlation
- IMSI swapping detection
- SIM swapping indicators
- Multiple SIM usage patterns
- Device sharing detection

## SEGMENT 9.8 Timeline Reconstruction

### Topics:

- Event sequencing
- Cross-case timeline correlation
- Integration with CCTV, GPS, and app logs
- Incident window analysis

## SEGMENT 9.9 Legal & Court Presentation

### Topics:

- Chain of custody
- Evidence integrity
- CDR authenticity
- Court admissibility
- Report writing format
- Expert testimony preparation

## SEGMENT 9.10 Hands-On Case Study

### Activities:

- Realistic CDR dataset
- Suspect identification
- Movement tracing
- Network analysis
- Final investigation report preparation

