Modeling and Design of Mobile Radio Networks: Fundamentals, Algorithms, and Protocols

Lecture Block	Title
DC2	Description of the Course
DC2.1	Historical Perspective of Mobile Radio Systems
DC2.2	Current Trends
DC2.3	The Course
LMS	Link Level: Modulation Schemes
LMS.1	Narrowband Phase Modulation Schemes: CPM
LMS.2	Performance of CPM with interference
LMS.3	Multi-Carrier Modulation Schemes: OFDM
LMS.4	Performance of OFDM with interference
LMA	Link Level: Multiple Antennas
LMA.1	Basics of Linear Algebra
LMA.2	Systems with Multiple Antennas
LMA.3	MIMO-MRC
LMA.4	MISO with Beamforming
LMA.5	MISO with Alamuti
LMA.6	MIMO
LMA.7	Exercises
MLS	Methods: Link Level Simulation
MLS.1	Simulating a Link
MLS.1	Simulating Fading and Shadowing
NRA	Network Level: Radio Resource Assignment in Cellular Networks
NRA.1	Cellular Networks
NRA.2	Reuse
NRA.3	RANs: Network Spectrum Efficiency
NRA.4	Cluster Size Dimensioning
NRA.5	Exercises
NRM	Network Level: Radio Resource Management
NRM.1	RRM techniques
NRM.2	Power Control
NRM.3	Hard and Soft Handover
NRM.4	Exercises
MAS	Methods: Access Level Simulation
MAS.1	Simulating Traffic Generation
MAS.2	Simulating Node Spatial Distribution
MAS.3	Simulating MAC
MNS	Methods: Network Level Simulation
MNS.1	KPIs
MNS.2	Simulating Networks
MNS.3	Simulating Mobility
MNS.4	Lab Activities
MRN	Mobile Radio Networks
MRN.1	Network Architectures
MRN.2	Mobility Management
MRN.3	GSM: PHY/MAC
MRN.4	GSM: Measurement Reports
MRN.5	GSM: RRM
MRN.6	GPRS
MRN.7	EDGE
MRN.8	UMTS: PHY/MAC
MRN.9	UMTS: RRM
MRN.10	HSPA
MRN.11	LTE: PHY/MAC
MRN.12	LTE: RRM
MRN.13	4G
ATT	Additional Topics and Techniques
ATT.1	Basics of Positioning
ATT.2	Global Positioning via Satellite
ATT.3	Distributed Localisation
ATT.4	HetNets and Small Cells
ATT.5	Millimiter Waves
ATT.6	Wireless Backhaul Issues
ATT.7	Cooperative Communications
ATT.8	CoMP
ATT.9	Interference Alignment
ATT.10	Delay Tolerant Networking
ATT.11	Towards 5G
CON	Conclusions
CON.1	Summary