

## Mobile Radio Networks M – A.Y. 2018/19 – Prof. Roberto Verdone – 6 credits – Second Semester

<i>INT</i>	<i>Introduction</i>	<b>3</b>
INT.0	Premise	
INT.1	Radio Networks	1
INT.2	Radio Communication Standards	½
INT.3	Trends	1
INT.4	The Course	½
INT.5	Appendix	
<i>RRA</i>	<i>Radio Resource Assignment: Fundamentals</i>	<b>2</b>
RRA.1	Radio Resources	1
RRA.2	Assignment of Radio Resources	1
<i>DTN</i>	<i>Digital Transmission in Noise Limited Systems</i>	<b>10</b>
DTN.1	Fundamentals of Digital Communications	1
DTN.2	Communication Link: System Model	½
DTN.3	Energy Efficiency	½
DTN.4	Signal Based Power Control	½
DTN.5	Link Performance (BER) of M-QASK in AWGN	½
DTN.6	Link Adaptation	½
DTN.7	Equalization	½
DTN.8	FEC, ARQ, HARQ	1 ½
DTN.9	Link Performance (BLER) and Capacity in AWGN	½
DTN.10	Exercises	3
DTN.11	Fundamentals of Digital Communications / 2	1
<i>LRC</i>	<i>Radio Channel</i>	<b>7</b>
LRC.1	Fundamentals of Radio Propagation / 1	1
LRC.2	Radio Channel Characterization	½
LRC.3	Large Scale Phenomena	½
LRC.4	Small Scale Phenomena	1
LRC.5	Narrowband Mobile Radio Channel	1
LRC.6	Link Performance in the Presence of Fading	½
LRC.7	Area Coverage Probability	1
LRC.8	Exercises	1
LRC.9	Fundamentals of Radio Propagation / 2	½
<i>LCF</i>	<i>Countermeasures to Fading</i>	<b>6</b>
LCF.1	Interleaving	½
LCF.2	Adaptive Modulation and Coding	½
LCF.3	Diversity	1
LCF.4	Direct Sequence Spread Spectrum	½
LCF.5	Frequency Hopping Spread Spectrum	½
LCF.6	MultiCarrier Modulation	½
LCF.7	Link Performance with FEC and Diversity	1
LCF.8	Exercises	1 ½
<i>DTI</i>	<i>Digital Transmission in Interference Limited Systems</i>	<b>11</b>
DTI.1	Fundamentals of Wireless Networking	½
DTI.2	Communication Link with Interference: System Model	½
DTI.3	Interference Based Power Control	½
DTI.4	Linear and Non Linear Demodulation	½
DTI.5	Link Performance (BER) of M-QASK with Interference	1 ½
DTI.6	Capture Effect	½
DTI.7	Direct Sequence Spread Spectrum with interference	1 ½
DTI.8	Link Level Outage Probability with Fading and Interference	1
DTI.9	Interference Based Power Control from a Network Level viewpoint	1 ½
DTI.10	Exercises	2
DTI.11	Fundamentals of Wireless Networking / 2	1
<i>MNA</i>	<i>Mobile Network Architectures</i>	<b>4</b>
MNA.3	Steps From GSM to 4G	1
MNA.4	Network Architectures: Evolution From GSM to 4G	1
MNA.5	Mobility Management	1
MNA.6	Network Architectures: Evolution towards 5G	1
<i>RRC</i>	<i>Radio Resource Assignment in Cellular Networks</i>	<b>4</b>
RRC.1	Cellular Networks	1
RRC.2	Reuse	1
RRC.3	Cluster Size Dimensioning	1
RRC.4	Exercises	1
<i>RRM</i>	<i>Radio Resource Management</i>	<b>6</b>
RRM.1	RRM techniques	1 ½
RRM.2	Scheduling	2
RRM.3	Hard and Soft Handover	1 ½
RRM.4	Admission Control, Load Control	1
<i>MRN</i>	<i>Mobile Radio Networks</i>	<b>11</b>
MRN.1	Numerology: Evolution From GSM to 5G	1
MRN.2	2G (GSM): PHY, MAC and RLC	1
MRN.3	2G (GSM): Measurement Reports	1
MRN.4	2.5G (GPRS)	½
MRN.5	2.5G (EDGE)	½
MRN.6	LTE: PHY, MAC and RLC	1
MRN.7	4G (LTE-A)	1
MRN.8	IoT	1
MRN.9	NB-IOT	1
MRN.10	5G	1