Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
ETC702	Mobile communication	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Ave. Of Test 1 and Test 2					
ETC702	Mobile communication	20	20	20	80	-	-	-	100

Prerequisites:
- ETC 601 Digital Communication
- ETC 603 Computer Communication and Networks

Course Objective:
- To study the concept of Mobile radio propagation, cellular system design.
- To understand mobile technologies like GSM and CDMA.
- To know the mobile communication evolution of 2G, 3G and 3 GPP in detail.
- To have overview of immerging technologies for 4 G standards.

Course Outcomes: Students will be able to:
- Understand GSM, CDMA concepts and architecture, frame structure, system capacity, services provided.
- Study of evolution of mobile communication generations 2G, 2.5G, 3G with their characteristics and limitations.
- Understand emerging technologies required for fourth generation mobile systems such as SDR, MIMO etc.
- Understand different indoor and outdoor propagation models related to losses and different types of fading.

Module No.		Topics	Hrs.
1. 0		**Fundamentals of Mobile Communication**	10
	1.1	Introduction to wire1ess communication	
	1.2	Frequency Division Multiple access, Time Division Multiple access, Spread Spectrum Multiple access, Space Division Multiple access, and OFDM	
	1.3	Frequency reuse, channel assignment strategies, handoff strategies, interference and system capacity, trunking and grade of service, improving the capacity of cellular systems. and related design problems	
2.0		**2G Technologies**	13
	2.1	GSM Network architecture, signaling protocol architecture, identifiers, channels, introduction frame structure, speech coder RPE-LTP, authentication and security, call procedure, handoff procedure, services and features	
	2.2	**GSM evolution in GPRS and EDGE:** Architecture and services offered	
	2.3	**IS-95 A& B(CDMA-1):** Frequency and channel specifications of forward and reverse CDMA channel, packet and frame formats, mobility and radio resource management	
3.0		**3G Technology**	09
	3.1	**IMT-2000/UMTS:** Network architecture, air Interface specification, forward and reverse channels in W-CDMA and CDMA 2000, spreading and modulation.	
	3.2	Cell search and synchronization, establishing a connection, hand off and power control in 3G system	
4.0		**3GPP LTE**	08
	4.1	Introduction and system overview	
	4.2	Frequency bands and spectrum ,network structure, and protocol structure	
	4.3	Frame slots and symbols, modulation, coding, multiple antenna techniques	
	4.4	**Logical and Physical Channels:** Mapping of data on to logical sub-channels physical layer procedures, establishing a connection, retransmission and reliability, power control.	
5.0		**Emerging Technologies for 4G**	06
	5.1	4G Introduction and vision	
	5.2	Multi antenna Technologies: MIMO; software defined radio	
	5.3	Adaptive multiple antenna techniques, radio resource management, QOS requirements	
	5.4	Overview of 4G research initiatives and developments.	
6.0		**Mobile Radio Propagation**	06
	6.1	Study of indoor and outdoor propagation models	
	6.2	Small scale fading and multi-path Small-scale multi-path propagation, parameter of multi-path channels, types of small scale fading, Raleigh and Ricean distribution,	
Total			52

Recommended Books:
1. Theodore S. Rappaport , "*Wireless Communications*", Prentice Hall of India, PTR publication
2. Andreas Molisch , "*Wireless Communications*", Wiley, Student second Edition.
3. Vijay Garg , "*Wireless Network Evolution 2G-3G*", Pearson Education.
4. Young Kyun Kim and Ramjee Prasad, "*4 G Roadmap and Emerging Communication Technologies* ", Artech house.:
5. Raj Pandya , "*Mobile And Personal Communications Systems And Services*", Prentice hall.
6. Singhal , "*Wireless Communication*", TMH
7. C.Y Lee , "Mobile Communication", Wiley

Internal Assessment (IA):

Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the test will be considered as final IA marks

End Semester Examination:

1. Question paper will comprise of 6 questions, each of 20 marks.
2. Total 4 questions need to be solved.
3. Question No.1 will be compulsory and based on entire syllabus wherein sub questions of 2 to 5 marks will be asked.
4. Remaining question will be selected from all the modules.