



UTTAR PRADESH



AMITY UNIVERSITY  
UTTAR PRADESH

Annexure 'AAB-CD-01'

**Course Title:DESIGN OF MOBILE SYSTEMS**

**Course Code:TELE701**

**Credit Units:4**

**Level: PG**

**Prerequisites : GSM and CDMA Systems**

L	T	P/ S	SW/F W	TOTAL CREDIT UNITS
3	-	-	2	4

**Course Objectives:** To teach design of RF, Access and core networks

**Prerequisites:** GSM and CDMA Systems

Course Contents / Syllabus:		Weightage
1	<b>Module I System Design Fundamentals</b>	<b>35% Weightage</b>
	Review of Cellular Concepts	
	Handoff strategies: prioritizing handoffs, practical handoff considerations	
	Interference and system capacity: co-channel interference and system capacity, channel planning for wireless systems, adjacent channel interference, power control for reducing interference	

	<p>Trunking and grade of service,</p> <p>Improving Coverage &amp; Capacity: cell splitting, sectoring, repeaters for range extension, microcell zone concept.</p>	
<b>2</b>	<p><b>Module II Mobile Radio Path Loss</b></p> <p>Large Scale Path Loss</p> <p>Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, Three Basic Propagation Mechanism.</p> <p>Reflection : Reflection from Dielectrics, Brewster Angle and Reflection from Perfect Conductors, Ground Reflection (Two-Ray ) Model.</p> <p>Diffraction : Fresnel Zone Geometry, Knife – Diffraction Model and Multiple Knife – edge Diffraction.</p> <p>Scattering: Radar Cross Section Model</p> <p>Practical Link Budget Design Using Path Loss Models: Log – distance Path Loss Model, Log normal Shadowing and Determination of Percentage of coverage Area.</p> <p>Mobile Radio Propagation</p> <p>Small- Scale Fading and Multipath : Small-scale Multipath Propagation, Factors Influencing Small – Scale Fading, Doppler Shift Impulse Response Model of a Multipath Channel, Small – Scale Multipath Measurements, Parameters of Mobile Multipath Channels : Time Dispersion Parameters, Coherence Bandwidth and Doppler Spread and Coherence Time</p> <p>Types of Small- Scale Fading:</p>	<b>35% Weightage</b>

	Fading Effects Due to Multipath Time Delay Spread, Flat Fading, Fading Effects Due to Doppler Spread, Fast Fading , Rayleigh and Ricean Distributions	
<b>3</b>	<b>Module III RF Engineering and Network Planning</b>	<b>20% Weightage</b>
	Introduction, Radio Design for a Cellular Network, Radio Network Planning, Radio Link Design, Estimation of Cell Count, Radio Coverage Planning.  Propagation Models : Outdoor Propagation Models Longley –Rice Model , Okumura Model, Hata Model Indoor Propagation Model : Partition Losses ( Same Floor), Partition Losses between Floors Log – distance Path Loss Model, Attenuation Factor Model IMT-2000 Model .	
<b>4</b>	<b>Module IV Practice of Mobile Network Planning and Operations</b>	<b>10% Weightage</b>
	Managed Services, Passive Infra sharing, Active Infra Sharing, Backhaul systems-optical/microwave/satellite, Siteing of Mobile sites, ROW	

**Student Learning Outcomes:**

- Demonstrate theoretical knowledge of specific mobile communications and networks and comprehensive understanding of mobile radio propagation.
- Critically analyse requirements and develop and evaluate the impact of QoS on Capacity and Coverage
- Apply theoretical models to predict network performance
- Modify theoretical results of network Coverage and Capacity to cater for the actual channel conditions.
- Design a Mobile Network including the Backhaul for a given geographical area using web based tools.

**Pedagogy for Course Delivery:**

Course will involve classroom teaching based on theoretical concepts. Interaction with the students will be integral part of learning. Periodical tutorials and assignments will be discussed and analyzed in class. Industry experts may shall come and share their experiences with the students.

**Assessment/ Examination Scheme:**

<b>Theory L/T (%)</b>	<b>Lab/Practical/Studio (%)</b>	<b>Total</b>
100%	NA	100

**Theory Assessment (L&T):**

<b>Continuous Assessment/Internal Assessment</b>					<b>End Term Examination</b>
<b>Components (Drop down)</b>	Class Test	Home Assignment	S/V/Q	Attendance	
<b>Weightage (%)</b>	10%	10%	5%	5%	70%

**Text:**

Principles & Applications of GSM by V K Garg  
IS-95 CDMA and cdma 2000, by V K Garg  
Wireless Communications by Theodore