

Course Title: Cellular Mobile Communication

Course Code: ETEG 429

Credit Hours: 3

Course Description:

The course introduces the basic concepts of mobile communication and its scope in Nepal.

Course Contents:

Unit 1: Introduction

Why cellular mobile telephone systems, History of GSM, GSM standards

Unit 2: Wireless Transmission

Multiplexing and Multiple Access Techniques: CDMA; Interleaving Techniques; Modulation; Spread Spectrum; Error Correction Coding; Diversity Techniques

Unit 3: Mobile Radio Propagation

Free Space Propagation; Radio Horizon and Propagation Modes: Effect of atmosphere, Characteristics of terrain and its effects, Propagation modes; LOS and Diffraction Propagation Modes; Empirical Propagation Formulas: Hata and CCIRR formulas, Walfisch-Ikegami formulas; Computer Propagation loss models; Use of propagation modes in cellular design:- coverage area vs. maximum tolerable propagation loss.

Unit 4: System Description

The GSM Architecture: Mobile Station, Base Station Subsystem, Network Subsystem, Operation Subsystem; GSM Channel Structure; Radio Resource Management: Handover, Frequency Hopping; Mobility Management: Location Updating, Authentication, Ciphering

Unit 5: Cellular System Engineering

Review of Telephone Traffic Theory: Traffic load and Trunk size, Erlang B; The Cellular Concept:- Frequency Reuse, Cell geometry, Selection of Cluster size, Cell splitting and base station power; Coverage and Capacity in Cellular System:- Link budget, System coverage vs. traffic load; Grade of Service

Unit 6: Case Study

GSM System in Nepal

References:

1. Jochen Schiller, *Mobile Communications*, Pearson Education
2. J. S. Lee and L. E. Miller, *CDMA System Engineering Handbook*, Artech House, London
3. William C. Y. Lee, *Mobile Cellular Telecommunication System*, McGraw Hill
4. William Webb, *Understanding Cellular Radio*, Artech House, London
5. Saleh Faruque, *Cellular Mobile System Engineering*, Artech House, London

Evaluation:

In-Semester Evaluation: 50%

End-Semester Evaluation: 50%