

Course Code: ICE 2211

Course Title: Cellular and Mobile Communication

Credit: 3.00, 75 Marks, 3 Hours/week, Lectures: 42, Exam time: 3 hours

Course Contents

Introduction: Introduction to Cellular Mobile Radio Systems: Limitations of conventional mobile telephone systems, a basic cellular system, performance criteria, operation of cellular systems, planning a cellular system, overview of generation of the cellular system.

Cellular Engineering Fundamentals: Introduction, frequency reuse, channel assignment strategies, handoff strategies: prioritizing handoffs, Practical handoff considerations.

Interference and System Capacity: Co-channel interference, adjacent channel interference, channel planning, power control for reducing interference, Trunking and GoS, improving coverage and capacity in cellular system: cell splitting, sectoring, microcell zone concept.

Intelligent Cell Concept and Applications: Intelligent Cell, The philosophy of implementing power delivery intelligent cells: delivering power intelligently, radio capacity; Power-delivery intelligent cells: zone-divided cells, intelligent microcell, Applications of intelligent Microcell Systems, In-building communication.

Mobile Radio Propagation (Large-Scale) Model: Free space propagation model, Basic propagation mechanisms, Ground reflection (Two-Ray) model, Fresnel zone geometry, Knife-edge diffraction model, Practical Link Budget Design: Log-distance path loss model, Log-normal shadowing, Outdoor and Indoor propagation models.

Mobile Radio Propagation (Small-Scale) Model: Small-Scale multipath propagation, Factors influencing small-scale fading, Doppler shift, Impulse Response Model of a Multipath Channel, SmallScale Multipath Measurements, Parameters of mobile multipath channels, Types of small-scale fading, Fading effects due to multipath time delay spread and Doppler spread.

Mobile Data Networks: Introduction, Data-Oriented CDPD Network: CDPD, Architecture in CDPD, Mobility Support in CDPD, Protocol layer in CDPD, GPRS and Higher Data Rates: GPRS, Architecture in GPRS, Mobility Support in GPRS, Protocol layers in GPRS, Mobile Application Protocols.

Wireless Systems and Standards: AMPS and ETACS: System overview, Call handling and air interface, United States Digital Cellular (IS-54 and IS-136), GSM: Services and features, System architecture, Radio subsystem, GSM channel types, Frame structure, Signal processing in GSM, IS-95: Frequency and channel specifications, Forward and reverse CDMA channels.

Text Books:

1. T S Rappaport : *Principles of Wireless Communication*
2. William C. Y. Lee : *Wireless and Cellular Telecommunications*
3. Pahlavan and Krishnamurty : *Principles of Wireless Network*