

M.TECH - Ist year

DEPARTMENT OF ECE

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE

Course Title	Broadband Wireless Technologies		
Course Code	EC604	No. of Credits	3
Department	ECE	Faculty	Dr.P.Muthu Chidambara nathan
Pre-requisites Course Code	Engineering Electromagnetics, Digital Communication		
Course Coordinator(s) (if, applicable)	Dr.P.Muthu Chidambara nathan		
Other Course Teacher(s)/Tutor(s) E-mail	muthuc@nitt.edu	Telephone No.	0431-2503309
Course Type	Core course		

COURSE OVERVIEW

COURSE CONTENT

Introduction to Wireless Communication. The Cellular concept, System design, Capacity improvement in cellular systems, Co channel interference reduction. Intelligent cell concept and applications. Technical Challenges.

Mobile radio propagation: Reflection, Diffraction. Fading. Multipath Propagation. Channel modeling, Diversity Schemes and Combining Techniques.

Design parameters at the base station, Practical link budget design using path loss models. Smart antenna systems, Beamforming. MIMO Systems. RAKE receiver.

Multiuser Systems: CDMA- Principle, Network design, Link capacity, Power control, WCDMA- Network planning, MC-CDMA, OFDM, Cellular mobile communication beyond 3G.

GSM, IS-95, GPRS, UMTS, WLAN, WPAN, WMAN, Ultra Wideband communications, 4G and beyond 4G.

COURSE OBJECTIVES

- To expose the students to understand mobile radio communication principles and to study the recent trends adopted in cellular systems and wireless standards.

COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes (PO)
CO1: Interpret the cellular system design and technical challenges.	PO1 – H
CO2: Compare/ Contrast the various techniques involved in mobile radio propagation, fading, diversity concepts and the multipath channel.	PO4 – H
CO3: Summarize the design parameters, link design, smart antenna, beam forming and MIMO systems.	PO4 – H
CO4: Compare/ Contrast Multiuser Systems, CDMA, WCDMA network planning and OFDM Concepts.	PO1 – H PO3 – M
CO5: summarize the principles and applications of wireless systems and standards.	PO 10 - H

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1.	Week 1	Introduction to Wireless Communication , The Cellular concept, System design, Problems	Chalk and talk and Power Point Presentation
2.	Week 2	Capacity improvement in cellular systems, Problems, Co channel interference reduction	Chalk and talk
3.	Week 3	Intelligent cell concept and applications, Technical Challenges, Mobile radio propagation	Chalk and talk
4.	Week 4	Reflection, Diffraction, Problems, Wireless Channels, Fading	Chalk and talk
5.	Week 5	Multipath Propagation. Channel modeling, Diversity Schemes and Combining Techniques	Chalk and talk
6.	Week 6	Design parameters at the base station, Mobile Station	Chalk and talk
7.	Week 7	Practical link budget design using path loss models, Smart antenna systems	Chalk and talk

8.	Week 8	Beamforming, MIMO Systems	Chalk and talk
9.	Week 9	RAKE receiver, Multiuser Systems	Chalk and talk
10.	Week 10	CDMA- Principle, Network design, Link capacity, Power control	Chalk and talk
11.	Week 11	WCDMA-Network planning, MC-CDMA	Chalk and talk and Power Point Presentation
12.	Week 12	OFDM, Cellular mobile communication beyond 3G	Chalk and talk and Power Point Presentation
13.	Week 13	GSM, GPRS, IS 95	Chalk and talk and Power Point Presentation
14.	Week 14	UMTS, WLAN, WPAN, WMAN, Ultra Wideband communications	Chalk and talk and Power Point Presentation
15.	Week 15	4G and beyond 4G	Chalk and talk and Power Point Presentation

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Written Test -1 (Unit 1, 2)	Week-7	1 hour	20
2.	Written Test – 2 (Unit 3, 4)	Week - 13	1 hour	20
3.	Seminar/ assignment	Week – 14, 15		10
4.	Compensation assessment for absentees	Week 16	1 hour	20
5.	End Semester Exam (All Units)	Week-17	3 Hours	50

ESSENTIAL READINGS : Textbooks, reference books, journals, etc

