

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

<b>COURSE OUTLINE TEMPLATE</b>			
<b>Course Title</b>	<b>Broadband Wireless Technologies</b>		
<b>Course Code</b>	EC604	<b>No. of Credits</b>	3
<b>Department</b>	ECE	<b>Faculty</b>	Dr.P.Muthu Chidambara nathan
<b>Pre-requisites Course Code</b>	Engineering Electromagnetics, Digital Communication		
<b>Course Coordinator(s) (if, applicable)</b>	Dr.P.Muthu Chidambara nathan		
<b>Other Course Teacher(s)/Tutor(s) E-mail</b>	muthuc@nitt.edu	<b>Telephone No.</b>	0431-2503309
<b>Course Type</b>	Core course		
<b>COURSE OVERVIEW</b>			
<b>COURSE CONTENT</b>			
<p>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.</p> <p>Mobile radio propagation: Reflection, Diffraction. Fading. Multipath Propagation. Channel modeling, Diversity Schemes and Combining Techniques.</p> <p>Design parameters at the base station, Practical link budget design using path loss models. Smart antenna systems, Beamforming. MIMO Systems. RAKE receiver.</p> <p>Multiuser Systems: CDMA- Principle, Network design, Link capacity, Power control, WCDMA- Network planning, MC-CDMA, OFDM, Cellular mobile communication beyond 3G.</p> <p>GSM, IS-95, GPRS, UMTS, WLAN, WPAN, WMAN, Ultra Wideband communications, 4G and beyond 4G.</p>			
<b>COURSE OBJECTIVES</b>			
<ul style="list-style-type: none"> <li>• To expose the students to understand mobile radio communication principles and to study the recent trends adopted in cellular systems and wireless standards.</li> </ul>			

<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>			<b>Aligned Programme Outcomes (PO)</b>
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
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>			
<b>S.No.</b>	<b>Week</b>	<b>Topic</b>	<b>Mode of Delivery</b>
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.	<b>Week 8</b>	Beamforming, MIMO Systems	Chalk and talk
9.	<b>Week 9</b>	RAKE receiver, Multiuser Systems	Chalk and talk
10.	<b>Week 10</b>	CDMA- Principle, Network design, Link capacity, Power control	Chalk and talk
11.	<b>Week 11</b>	WCDMA-Network planning, MC-CDMA	Chalk and talk and Power Point Presentation
12.	<b>Week 12</b>	OFDM, Cellular mobile communication beyond 3G	Chalk and talk and Power Point Presentation
13.	<b>Week 13</b>	GSM, GPRS, IS 95	Chalk and talk and Power Point Presentation
14.	<b>Week 14</b>	UMTS, WLAN, WPAN, WMAN, Ultra Wideband communications	Chalk and talk and Power Point Presentation
15.	<b>Week 15</b>	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	Week-7	1 hour	20
2.	Written Test - 2	Week - 13	1 hour	20
3.	Seminar/ assignment	Week – 14, 15		10
4.	End Semester Exam	Week-17	3 Hours	50

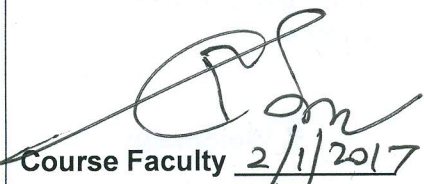
#### **ESSENTIAL READINGS : Textbooks, reference books, journals, etc**

##### **Text Books**

1. A.F.Molisch, *Wireless Communications*, Wiley, 2005.
2. A.Goldsmith, *Wireless Communications*, Cambridge University Press, 2005.

##### **Reference Books**

1. P.Muthu Chidambara Nathan, *"Wireless Communication"s*, PHI, 2008.
2. Ke-Lin Du, M.N.S.Swamy, *"Wireless Communication Systems"*, Cambridge University Press, 2010.
3. K.Fazel & S. Kaiser, *"Multi-carrier and Spread Spectrum Systems"*, Wiley, 2003
4. S.G. Glisic, *"Advanced Wireless Communications"*, 4G Technologies, Wiley, 2004.
5. W.C.Y.Lee, *"Mobile Communication Engineering"*, (2/e), McGraw- Hill, 1998.
6. S.G. Glisic, *"Adaptive CDMA"*, Wiley, 2003

<b>COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)</b>
Class Committee meetings, Student Feedback
<b>COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)</b>
Min. 75% attendance for the students to appear for end semester examination Passing Min.: 40% of class maximum marks
<b>ADDITIONAL COURSE INFORMATION</b>
The Course Coordinator is available for consultation at times that are displayed on the coordinator's office notice board. Queries may also be emailed to the Course Coordinator directly at <a href="mailto:muthuc@nitt.edu">muthuc@nitt.edu</a>
<b>FOR SENATE'S CONSIDERATION</b>
 Course Faculty <u>2/1/2017</u> CC-Chairperson <u>M. M. 7</u> HOD <u>[Signature]</u> <span style="margin-left: 300px;">4/1/2017</span>