

University of Macau  
Faculty of Science and Technology  
Department of Electrical and Electronics Engineering

**Part A: Course Outline**

Course Title:	Telecommunication Systems		
Course Code:	ELEC482	Year of Study:	4
Compulsory/Elective:	Elective		
Course Prerequisites:	ELEC361 – Telecommunication		
Prerequisite Knowledge	Electromagnetics and propagation, telecommunication		
Class/Laboratory Schedule:	3 hours for lecture and 2 hours for tutorial/experiment per week		
Duration	One semester	Credit Units	3.5
Text Books and References:	<p>[1] Jochen Schiller, <i>Mobile Communications</i>, 2<sup>nd</sup> Ed., Pearson, 2003</p> <p>[2] David Tse, Pramod Viswanath, <i>Fundamentals of Wireless Communication</i>, 1<sup>st</sup> Ed., Cambridge, 2005</p> <p>[3] Theodore S. Rappaport, <i>Wireless Communications: Principles and Practice</i>, 2<sup>nd</sup> Ed., Prentice Hall, 2002</p>		
Course Description:	<p>This course presents the modern mobile communication systems with a particular emphasis Global System for Mobile Communications (GSM), Digital Enhanced Cordless Telecommunications (DECT), and Universal Mobile Telecommunications System (UMTS). GSM is the most popular standard for mobile telephony systems in the world while UMTS is one of the third-generation (3G) mobile telecommunications technologies, which is also being developed into a 4G technology. The most common form of UMTS is W-CDMA. In this course, both the system-level descriptions and the practical simulation or measurement techniques will be given with a balance treatment. In addition, digital wireless communication system, such as, wireless LAN (WLAN), Bluetooth, or Ultrawideband (UWB) will also be covered.</p>		
Topics Covered	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Cellular Communication Systems</li> <li>3. Digital Wireless Communication Systems</li> </ol>		
Course Objectives:	<ol style="list-style-type: none"> <li>1. To introduce the infrastructures and operations of various 2G and 3G cellular communication systems, and digital wireless communication systems, [a, b, c, d, e, k]</li> <li>2. To prepare students to know both simulation and measurement techniques for the assessment of radiation, [b, d, k, l]</li> <li>3. To develop students to understand the trend of latest mobile communication system development, [a, c, d, e]</li> </ol>		

Course Assessment:	Quizzes: 10%	Examination: 40%	Simulation: 25%	Measurement: 25%
Relationship to Program Objectives and Outcomes	<p>This course primarily contributes to EEE program outcomes that develop students abilities to:</p> <ul style="list-style-type: none"> <li>a. Ability to apply knowledge of mathematics, science and engineering.</li> <li>b. Ability to design and conduct experiments.</li> <li>k. Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.</li> <li>l. Ability to use the computer/IT tools relevant to the discipline along with an understanding of their processes and limitations</li> </ul> <p>This course secondarily contributes to EEE program outcomes that develop students abilities to:</p> <ul style="list-style-type: none"> <li>c. Ability to design a system, component or process to meet desired needs.</li> <li>d. Ability to function on multidisciplinary teams.</li> <li>e. Ability to identify, formulate and solve engineering problems.</li> </ul>			
Course Contents and Relationship to Program Criteria:	Week no.	Topics	Program Criteria	
	2	<b>Introduction</b> Historical review, applications, market vision, frequencies and regulations, signals, antennas, signal propagation, multiplexing, modulation, spread spectrum, cellular system	PS, DIC, CS, ES	
	9	<b>Cellular Communication Systems</b> GSM, DECT, TETRA, UMTS/IMT-200, WCDMA, radiation measurement	CS, ES	
	3	<b>Digital Wireless Communication Systems</b> IR vs. radio, infrastructure/ad-hoc, IEEE 802.11 (a, b, g, h), HiperLAN2, mobile QoS, Bluetooth, IEEE 802.15, UWB	CS, ES	
Contribution of Course to meet the professional component:	This course trains students to work professionally in the area of telecommunication system. Students should be able to apply knowledge of mathematics, science and engineering, as well as the techniques, skills, and modern engineering tools to analyze or solve practical telecommunication-system problems.			
Course Instructor(s):	Dr. Sio-Weng Ting (Tony)			
Prepared by:	Dr. Sio-Weng Ting (Tony)			



**Course Assessment Policy:**

- Quizzes will be given frequently! One of the quizzes with the lowest scores would be discarded at the end.
- 1 simulation project or 1 measurement project will be assigned. Individual reports are required to submit.
- 1 mid-term exam or final exam will be given.