

	4. Develop skills related to creative thinking, problem solving, oral and written communication (4.7).
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3. Contents

Topic	Total hours	Lectures	Tutorial/ Practical
Introduction and Fourier Transforms	2	2	0
DFT: Sampling in the frequency domain, Time-Domain aliasing	3	2	1
DFT: Properties, Circular convolution, and linear convolution using circular convolution	3	2	1
DFT: Frequency resolution and windowing	4	2	2
Fading: Origin of fading, Doppler frequency, Classification of fading channels	3	2	1
Fading: Fast and slow channels, Flat and frequency selective channels	3	2	1
Fading: Delay spread and coherence bandwidth, Doppler spread and coherence bandwidth	4	2	2
Multichannel Modulation (MCM): Advantages and how MCM combats ISI, Block diagram of MCM transceiver, Basis functions	2	2	0
MCM: The water-filling algorithm	2	2	0
Discrete Multi-tone DMT: Using DFT symmetry properties to generate real baseband MCM signal, DSL basics	5	4	1
OFDM: Properties of the wireless channel and introduction to multipath fading, and the delay spread, Advantages and disadvantages of OFDM systems in wireless channels, Guard time and cyclic extension	5	4	1
OFDM: Block diagram of a “digital” OFDM transceiver, Choice of OFDM parameters	4	4	0
Direct sequence Spread spectrum	3	2	1
Frequency Hopping Spread Spectrum	3	2	1
PN sequence generators	3	2	1
Immunity to jamming	3	2	1
Multiple access Techniques (FDMA, TDMA, CDMA)	2	2	0
Use of SS in ranging, Synchronization of SS	2	2	0
Total	56	42	14

4. Teaching and Learning Methods	Lectures (Y)	Practical Training/ Laboratory (Y) in ELC 404	Seminar/Workshop(N)
	Class Activity (Y)	Case Study (N)	Projects (Y)
	E-learning (Y)	Assignments /Homework (Y)	Other:

5. Student Assessment Methods

5.a. Method	To assess (with reference to the ILOs)
- Mid-term exam	a1, a2, a3, a4, b2, b3, c1.
- Reports	d1, d2, d3, d4.
- Final Exam	a1-a8, b1-b4, c1, c2,

5.b. Assessment Schedule	Week
-Assessment 1; Mid-term exam	8
-Assessment 2; Reports	4, 6, 12
-Assessment 3; Final Exam	15
5.c. Weighting of Assessments	
-Mid-Term Examination	20%
-Final-term Examination	70%
-Reports	10%
-Total	100 %
6. List of References	
6.a. Course Notes	
6.b. Essential Books (Text Books)	
<ul style="list-style-type: none"> • "Digital Signal processing", John G. Proakis and Dimitris K Manolakis. 	
<ul style="list-style-type: none"> • "OFDM for Wireless Multimedia Communications", Richard van Nee and Ramjee Prasad. 	
<ul style="list-style-type: none"> • "Wireless Communications: Principles and Practice", T. Rappaport 	
<ul style="list-style-type: none"> • "Communication Systems", Simon Haykin 	
6.c. Recommended Books: N/A	
6.d. Periodicals, Web Sites, ... etc: N/A	
7. Facilities Required for Teaching and Learning	
Basic classroom teaching facilities. (Mics, board, data show...)	
Course Coordinator:	Dr. Mohamed Khairy Dr. Yasmine Fahmy
Head of Department:	Prof. Dr. Mahmoud Taher El Hadidi
Date:	Feb 2011