Jordan University of Science and Technology
Faculty of Engineering
Electrical Engineering Department

EE524 RF Communication Circuits (3-0-3) 2nd Semester 2018/2019

CATALOG DESCRIPTION (2013):
3 Credit hours (3 h lectures, R[1]). Large-signal analysis. Network noise analysis. Tuned amplifiers. Intermodulation distortion. RF oscillators. Super-heterodyne receivers. Phase-locked loops. Frequency synthesizers. Mixers, modulators and demodulators. RF power amplifiers.

Text Book: Modern Communication Circuits , Jack Smith, 2nd edition, McGraw-Hill, 1998.
References:

1- RF Microelectronics, Behzad Razavi, Prentice Hall, 2nd Edition, 2011.

Prerequisites by topics: Semiconductor theory, electronic circuits, modulation techniques.
Prerequisites by course: Analog Communications (EE 450), Electronic Circuits (EE320)
Co-requisites by course: none, **Prerequisite for**: none

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Course Outline

Week	Topic	Reading	Assignment
1	Introduction to the hardware of communication systems.	Ch.1: 1.1-5	
2-3	Network noise & intermodulation distortion.	Ch.3: 3.1-3.5	
4-6	Oscillators: sinusoidal oscillators, crystal oscillators, voltage-controlled oscillators.	Ch.7: 7.1-7.7	
	First Exam		
7-9	Phase-locked loops: PLL model, phase detectors,VCOs, loop filters, PLL applications.	Ch.8: 8.1-8.9	
10-11	Frequency synthesizers: direct, PLL, and direct digital frequency synthesizers.	Ch.10: 10.1-10.5	
	Second Exam		
12-13	Power amplifiers: class A, class B, and class C.	Ch.11: 11.1-11-4	
14-15	Mixers, modulators, and demodulators	Ch.12: 12.1-12.5	
	Final Exam		

[1] Required of all students in the B.Sc. of Electrical Engineering - Communications (2013) Program

Evaluation

Homework 5% , Quizzes 5%, Two mid-term Exams 50%, Final Exam 40%

Category Content: **Engineering Science: 30 %; Engineering design: 70%**

Objectives and Outcomes[2]

Objectives	Outcomes
1: Study the sources of noise and distortion in communication circuits and their role in determining the sensitivity and the dynamic range of communication receivers. [1,2]	1: Able to identify the sources of noise and distortion in communication circuits and design low noise networks and able to calculate the sensitivity and the dynamic range of communication receivers. [1,2]
2: Study and design the different types of oscillators which are used in communication systems such as conventional, crystal, and VCO. [1,2]	2: Able to design different types of oscillators for different communication systems. [1,2]
3: Study the structure and characteristics of phase-locked loops and able to design them for different applications in communication systems. [1,2]	3: Able to analyze and design phase-locked loops for different applications in communication systems. [1,2]
4: Study the different types of frequency synthesizers such as direct, PLL, and direct digital and able to design them for different applications. [1,2]	4: Able to design frequency synthesizers for different applications in communication systems. [1,2]
5: Study the different types of power amplifiers such as class A, class B, and class C, and able to design them for different applications. [1,2]	5: Able to design different types of power amplifiers for different applications in communication systems. [1,2]
6: Study the different types of mixers, modulators and demodulators. [1,2]	6: Able to design different types of mixers, modulators and demodulators for communication systems. [1,2]

Contribution of Course to Meeting the Professional Component

The course contributes to building the fundamental basic concepts, applications, and design of Electrical Engineering.

Relationship to Program Outcomes (%)

1	2	3	4	5	6	7
50	50					

[2] Numbers in brackets refer to the Program outcomes