



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

EE 452 Communication Systems Lab
First Semester 2019-2020

2013 Course Catalog

1 Credit hour (3 h lab session, R¹). Tuned circuits and crystals. AM modulators. AM demodulators. Super-heterodyne radio receiver. FM modulators. FM demodulators. Simulation using Matlab/Simulink. Lab project.

Textbooks

Communications Lab Manual, Feedback.

References

Books

- 1) S. Haykin, Communication Systems, 4th Edition, Wiley, 2001.
- 2) J. G. Proakis, and M. Salehi, Fundamentals of Communication Systems, First Edition, Prentice Hall, 2004.

Instructor

Instructor **Dr. Mahmoud Khodeir**, E-mail: makhodeir@just.edu.jo

Prerequisites

Prerequisites by topic	Electronic Circuits Lab, Communications Systems
Prerequisites by course	EE 324, EE 450
Prerequisite for	EE 552

Topics Covered

Week	Topics	Chapter in Text
1	Introduction to the Lab	
2	Signal Source	Experiment 1
3	Tuned Circuit: - Part 1	Experiment 2; 2.1, 2.2, 2.3
4	Tuned Circuit: - Part 2 and the Crystal	Experiment 2; 2.4, Experiment 3
5	Amplifier	Experiment 4
6	Balanced Modulator	Experiment 6
7	Simple Amplitude Modulation	Experiment 7
8	Midterm Exam	
9	Detection and Demodulation	Experiment 8
10	Frequency Modulation	Experiment 10
11	Frequency Demodulation	Experiment 11
12	Super – Heterodyne Radio	Experiment 9
13	Final Exam	

Evaluation

Assessment Tool	Expected Due Date	Weight
Midterm Exam	In the eighth week at the time of the lab.	30%
Lab Report	One week after the completion of each lab session.	15%
Pre - Lab	At the beginning of each lab session.	5%
Quizzes	At the beginning of each lab session.	5%
Team Presentation	Each group will present an experiment in front of the students	5%
Final	As scheduled in the university calendar at the time of the lab.	40%

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

Objectives and Outcomes²	
Objectives	Outcomes
1. Familiarize the students with the common components of analog communications systems and examine their characteristics. [1,6]	1.1. Measure and plot the frequency spectrum characteristics of the tuned circuit.[1,6] 1.2. Measure the resonant frequency of the tuned circuit and estimate its Q-factor. [1,6] 1.3. Recognize the characteristics of the common-emitter amplifier circuit. [1,6] 1.4. Explain how to use the balanced modulator to generate an AM signal. [1,6]
2. Investigate the standard modulation and demodulation techniques of AM and FM systems. [1,2,6]	2.1. Explain how to use the transistor common-emitter circuit to generate a full AM signal. [1,2,6] 2.2. Explain how the parallel RC circuit can be used as a low-pass filter.[1,2] 2.3. Explain the operation of the tuned circuit as a slope detector for FM demodulation.[1,2] 2.4. Display the S-curve of the Round-Travis detector and Foster-Seeley discriminator. [1,6]
3. Provide students with the know-how to design and assemble standard AM and FM transmitters and receivers. [1,2,6]	3.1. Design and assemble a ring bridge modulator using four diodes to generate a DSBSC AM signal. [1,2,6] 3.2. Design and assemble a synchronous (coherent) AM demodulation circuit, which is used mainly in DSBSC demodulation. [1,2,6] 3.3. Design and assemble the Super – Heterodyne radio. [1,2,6]
4. Encourage life long learning, foster teamwork and enhance students' communication skills [3]	4.1 Write technical report and demonstrate orally their understanding of the experiment. [3]

Contribution of Course to Meeting the Professional Component

The course contributes to building the fundamental basic concepts, applications, and design of communications systems in electrical engineering.

Relationship to Program Outcomes (%)

1	2	3	4	5	6	7
36.38	24.19	2.5			36.93	

² Numbers in brackets refer to the Program outcomes