

COURSE SYLLABUS

Mobile Communications Engineering

2013131

COURSE DETAILS

Campus: Beer Sheva

Department: Electrical and Electronics Engineering

Discipline: Communication

Year of Study: Third

Semester: B

Credit: 3

ECTS Credit Points: 4.5

Lecturer(s): Dima Bykhovsky
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Academic year: 2020

Type of Course: Elective

Level of Course: Undergraduate

Mode of Delivery: Project oriented

Prerequisites: Introduction to 2000491
Communication
Introduction to 2002641
Random Processes

Co-Requisites:

Language of Instruction: English

Work Placement(s):

Teaching Assistant(s):

AIM

To introduce students to the realm of mobile/wireless communication, addressing its theoretical aspects and providing practical/hands-on experience with real-world wireless communication channels.

LEARNING OUTCOMES

On successful completion of the course, the students will be able to:

1. Distinguish and apply basic channel modeling.
2. Operate SDR (software-defined radio) hardware in an appropriate software environment, for example, MATLAB/Simulink or GNURadio, and to implement channel estimation with an SDR transceiver.
3. Derive distance and/or time-dependent statistics of channel gain measurements.
4. Compare theoretical channel models with experimental hands-on measurements.

COURSE CONTENTS

Week	Subject	Relevant Reading
1	Wave propagation and physical models, Friis formula, two-ray model	[1], Ch. 2
2	Simplified path-loss model, lognormal shadowing	[1], Ch. 2
3	Large-scale vs small-scale fading, multipath, Jakes model, fading distributions	[1], Ch. 3
4	Power-delay profile, Doppler shift, coherence time/distance/bandwidth	[1], Ch. 3
5	Introduction to SDR	[2], Ch. 3
6	Presentation of Final Project topic to students	[3]
7	Project meetings with students	
8	Project meetings with students	
9	Project meetings with students	
10	Project meetings with students	
11	Project meetings with students	
12	Students' presentations of project outcomes	

RECOMMENDED OR REQUIRED READING

Text book:

1. Goldsmith, Wireless Communications, Cambridge, 2005
2. [B. Stewart, Software Defined Radio using Matlab and Simulink and the RTL_SDR, Feb. 2017, Version 1.17.0208](#)
3. [D. Bykhovskiy, Teaching wireless channel modeling with software defined radio, Computer Applications in Engineering Education, 2020.](#)

Other readings:

4. T.S. Rappaport, Wireless Communications, 2nd, Pearson, 2002

PLANNED LEARNING ACTIVITIES AND TEACHING METHODS

Lecture hours: 3. This project-oriented (PO) course includes four frontal lectures and software-defined radio (SDR) implementation of the course theory. The course also includes a hackathon-based competition between students.

ASSESSMENT METHODS AND CRITERIA

Criterion	Percentage	Comments
Quizzes:	20%	
Project:	50%	Includes project report and a presentation in class
Hackathon:	20%	Participation is obligatory
Reports:	10%	Students must complete obligatory guided-reports on others' project reports

Guidelines

The Hackathon is held in conjunction with the "Transmission and Receiving Techniques" course.