

Instructor: Andy Molisch, Professor
530 EEB, 213 740 4670, molisch@usc.edu
Office hours: Monday, Wednesday 18h30-19h40

TA: Daoud Burghal, burghal@usc.edu

Course Web Page: <http://www-classes.usc.edu/engr/ee-s/535>(under construction)
Contains homework, solutions, and relevant handouts. Course announcements, homework hints and modifications will be posted on this page – please check it regularly.

Lectures: MW 15h30-16h50, OHE 100C

Course Objectives: To understand the issues involved in mobile communication system design and analysis.

Pre-requisite: EE 503

Co-requisite: Linear Algebra (EE441)).
Other Requirements: Basic computer skills (i.e. programming and plotting).

Grading:

25% Homework

30% Midterm (1.3 hours)

45% Final (2.0 hours)

Final grades will be assigned by a combination of student score distribution (curve) and the discretion of the instructor.

Preparation for classes:

- students are **required** to study the relevant sections of the book **before** the classes, in order to maximally profit from the explanations by the instructors.
- Solving additional exercises in the book is encouraged to provide deeper understanding of the treated problems. Hints for solution methods and checking whether answers are correct can be done during office hours.
- Self-assessment quiz: in Lecture 8, a quiz similar to a mid-term will be held. It will be graded, but will **not** affect the final grade of the students. Rather, it is intended to help students understand whether they can follow the course adequately or they need to make additional effort.

Grading policies:

- **Late Policy:** No late homework will be accepted. A late assignment results in a zero grade.
- **Make-up Exams:** No make-up exams will be given. If you cannot make the exam dates due to a class conflict, you must notify me by the last day to add/drop a course. If I cannot accommodate your schedule, you must drop the class. In the case of a required business trip or a medical emergency, a signed letter from your manager or doctor is required. This letter must include the telephone number of your doctor or supervisor.

- **Grade Adjustment:** If you dispute any scoring of a problem on an exam or homework set, you have one week from the date that the graded paper is returned to request a change in the grade. After this time, no further alterations will be considered. All requests for a change in grade must be submitted in writing to me.
- **Changes/Information:** The student is responsible for all assignments, changes of assignments, announcements, lecture notes etc. All such changes should be posted on the course web-site.
- **Other:** As per university guidelines published in SCampus, the academic conduct policy will be upheld. You are required to study <http://ee.usc.edu/sacss/> and the material linked there. Every homework has to contain a cover sheet in which collaborations and auxiliary material are declared. False declarations are a violation of academic integrity.

Course Textbook: A. F. Molisch, “Wireless Communications”, 2nd edition, IEEE-Press Wiley.

References (other mobile texts of interest):

1. S. Benedetto & E. Biglieri, Principles of Digital Transmission - With Wireless Applications , Kluwer Academic Publishers, Amsterdam 1999.
2. T. S. Rappaport, Wireless Communications, 2nd edition, Prentice Hall, 2002.
3. G. L. Stuber, Principles of Mobile Communications, 2nd edition, Kluwer, 2001.
4. D. Tse and P. Viswanath, Fundamentals of Wireless Communication, Cambridge University Press, 2005.
5. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2005.

Syllabus:

The course is based on the textbook “Wireless Communications” by A.F. Molisch.

Lecture	Topic	Corresponding book chapters
1	History, types of services	1.1, 1.2,
2	Requirements for services;	1.3, 1.4
3	Fundamental problems of wireless	2,
4	Noise- and interference limitation; Link budget	3
5	Fundamental propagation effects	4.1, 4.2, 4.31, 4.4.1, 4.5, App. 4A
6	Antennas	9
7	Fading	5.1-5.4,
8	Delay dispersion	6.1-6.3
9	Channel models	7.1-7.5
10	Communications block diagram	10
11	Modulation formats	11.1-11.3.2
12	Modulation formats	11.3.3-11.3.11
13	Mid-term Exam	
14	Demodulator structure	12.1
15	BER in fading channels	12.2-12.3
16	Diversity principles	13.1-13.3, 13.6
17	Performance of diversity systems	13.4-13.5
18	Error-correcting codes	14.1-14.3, 14.4
19	FDMA, TDMA, cellular principle	17.1-17.3, 17.5, 17.6
21	CDMA	18.1-18.2
22	CDMA II	18.3-18.4
23	OFDM I	19.1-19.4,
24	OFDM II	19.5, 19.8, 19.9-19.11
25	overflow	
26	final exam	

Lectures will not necessarily cover all material in the given chapters, but rather the instructor will select the most important aspects of each chapter/section.