
Syllabus

Webpage: <http://groups.csail.mit.edu/netmit/6.888/www/general.shtml>

Schedule: Lectures: Thursday 3pm-5pm, Room 32-124
Recitations: Friday 11am-12pm, Room 32-124

Staff: **Instructor:** Prof. Dina Katabi dina@csail.mit.edu 32-G936
 TA: Haitham Hassanieh haitham@csail.mit.edu 32-G934

Office Hours: Wednesdays 4 to 5pm, Room: 32-G925

Mailing Lists: Course mailing list: 6.888-course@mit.edu
Staff mailing list: 6.888-staff@mit.edu

Description: Graduate H-Level
Units: 3-0-9
Prereqs: Basic knowledge of computer and data networks

This subject qualifies as a subject in the Computer Systems or Communications Engineering. This class teaches hands-on experience with wireless communication systems. We will focus on how signals are transmitted and received, the impact of the wireless channels, and how to deal with noise and radio imperfections. We will also teach the basics of OFDM, interference cancellation, MIMO systems, interference alignment, wireless localization, low power networks, full duplex radios, 4G LTE ... There will be several labs and a project to teach you how to design and build a wireless system, how to test your system on software radios and how to do cross layer wireless research.

Lectures: Reading Material for each lecture is posted on the webpage. Students are expected to read the required readings and submit a mini assignment Students are expected to take notes in class. Each student has to scribe at least one lecture or one recitation. The lectures cover the below topics:

Topic	Date
LEC 1: Course Intro	Sept. 5
LEC 2: OFDM Primer	Sept. 12
LEC 3: Interference Cancellation	Sept. 19
LEC 4: Wireless Localization	Sept. 26
LEC 5: MIMO 1: Multiplexing, Diversity, Beamforming	Oct. 10
LEC 6: MIMO 2: Interference Alignment, Nulling, Virtual MIMO	Oct. 17
LEC 7: Wireless Based Gesture Recognition / See Through Walls	Oct. 24
LEC 8: RFIDs / Low Power Networks	Oct. 31
LEC 9: Full Duplex Radios	Nov. 7
LEC 10: 4G LTE Wireless Systems	Nov. 14

Labs: The labs in 6.888 will give you experience designing, building, and debugging a wireless system. The labs will be in matlab or in C++ for USRP software defined radios. The submission page will be setup soon and submission instructions will be mailed to you. Here is a list of the labs and their due dates:

Lab	Due Date
Lab 1a: OFDM Basic TX/RX	Friday Sept. 20, 11:59 pm
Lab 1b: OFDM Phase Tracking	Friday Sept. 27, 11:59 pm
Lab 2: Wireless Localization	Friday Oct. 4, 11:59 pm
Lab 3: MIMO	Friday Oct. 18, 11:59 pm
Lab 4: Interference Nulling on SDRs	Friday Oct. 25, 11:59 pm
Lab 5: WiVi: See Through Walls	Friday Nov. 1, 11:59 pm

Project: The course project is intended for students to carry out small research projects in teams of two or three. It has four components:

-**A proposal:** which describes your problem, why it is important, your plan for tackling the problem, and how you are going to evaluate the solution. It should be no more than 3 pages. **(Due: Wednesday Nov. 6, 2013)**

-**A progress report:** which explains your approach, related/prior work, any preliminary results you might have obtained. **(Due: Wednesday Nov. 20, 2013)**

-**A final report:** conference-style paper describing the project and its key contributions/findings. **(Due: Wednesday Dec. 4, 2013)**

-**A presentation:** conference-style presentation during the penultimate week of classes. **(Due: Wednesday Dec. 5, 2013)**

The course staff will meet with each team periodically during the semester to provide guidance and assess progress on the project.

Grading
50% Project
40% labs
5% Scribe
5% Mini Assignments

Late Policy: You can hand in your lab solutions late, but the total amount of lateness summed over all the deadlines must not exceed 72 hours. If you hand a lab in late, and your total late time (including the late time for that assignment) exceeds 72 hours, and you hand it in by the last day of classes, then we'll give it a D. You can divide up your 72 hours among the labs however you like; you don't have to ask or tell us. You can only use the 72 hours for the labs; not for the project.

Collaboration: You must write all the code you hand in for the labs, except for code that we give you as part of the lab. You are not allowed to look at anyone else's solution. You may discuss the labs with other students, but you may not look at or use each other's code.

References:
- OFDM Wireless LANs : A Theoretical and Practical Guide, John Terry and Juha Heiskala, Sams, 2002. Available @ MIT Libraries
- Fundamentals of Wireless Communication, David Tse and Pramod Viswanath, Cambridge University Press, 2005. Available Online