

ECE 453 FALL 2023
Wireless Communication Systems

Instructor

José Schutt-Ainé - 5042 ECEB (jesa@illinois.edu)

Class Time

9 am-9:50 am, MWF, ECEB 3013 & ONLINE

Lab Time

AB1: Tuesday 9:00 – 11:50 am

AB2: Tuesday 2:30 – 5:20 pm

AB3: Thursday –9:00 – 11:50 am

Teaching Assistant

Juhitha Konduru (juhitha2@illinois.edu)

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Textbook

Steven J. Franke, *Wireless Communication Systems*, Class Notes.

Course Web Page

The course web page is at <http://courses.engr.illinois.edu/ece453>. This is the primary means of staff-student communication outside of lecture hours.

Grading Policy

| | |
|---------------|--------------|
| Homework | 15% of total |
| Midterm Exams | 30% of total |
| Lab | 25% of total |
| Final Exam | 30% of total |

Homework Policy

Homework will be due on Fridays. Homework must be uploaded on the course web site by 5 pm at the drop box. Late homework will not be accepted. Homework solutions will be posted on the class web page on the day after the due date.

Office Hours

Wednesdays, 3-4PM - [ONLINE](#).

Questions regarding labs or homework should be posted on [Piazza](#).

Midterm Exams

Midterm Exam 1: Monday, October 2, 9:00 – 9:50 am

Midterm Exam 3: Friday, November 3, 9:00 – 9:50 am

Final Exam

Monday, December 11, 8:00–11:00 AM

Syllabus for ECE 453 Fall 2023 (Prof. Jose Schutt-Aine)

| Lec. | Day | Date | Topic | HW | Labs |
|------|----------|-----------------|--|----|------|
| 1 | M | 8/21/23 | Fourier Analysis | | 0 |
| 2 | W | 8/23/23 | Modulation Theorem | | |
| 3 | F | 8/25/23 | DSB Modulation and Demodulation | | |
| 4 | M | 8/28/23 | Nonlinear Modulation | | |
| 5 | W | 8/30/23 | Quadrature Modulation/Demodulation | | |
| 6 | F | 9/1/23 | Regenerative Receivers | | |
| | M | 9/4/23 | LABOR DAY - NO CLASS | | |
| 7 | W | 9/6/23 | Superheterodyne Receivers | | |
| 8 | F | 9/8/23 | AM Broadcasting | 1 | |
| 9 | M | 9/11/23 | FM Broadcasting | | 1 |
| 10 | W | 9/13/23 | Up- and down-conversion | | |
| 11 | F | 9/15/23 | Software Defined Radio | 2 | |
| 12 | M | 9/18/23 | Resonance | | 2 |
| 13 | W | 9/20/23 | Quality Factor Q | | |
| 14 | F | 9/22/23 | Oscillator Analysis | 3 | |
| 15 | M | 9/25/23 | Colpitt, Crystal, Voltage Controlled Oscillators | | 2 |
| 16 | W | 9/27/23 | Oscillator Phase Noise | | |
| 17 | F | 9/29/23 | Network Power Transfer | 4 | |
| | M | 10/2/23 | Exam 1 | | 3 |
| 18 | W | 10/4/23 | Lossless Matching Networks | | |
| 19 | F | 10/6/23 | Impedance Matching with Lossless L-Networks | 5 | |
| 20 | M | 10/9/23 | Three-element matching networks | | 4 |
| 21 | W | 10/11/23 | Pi and T matching networks | | |
| 22 | F | 10/13/23 | Y, Z, H, ABCD Parameters | 6 | |
| 23 | M | 10/16/23 | S Parameters | | 5 |
| 24 | W | 10/18/23 | Application of S parameters | | |
| 25 | F | 10/20/23 | Stability Analysis | 7 | |
| 26 | M | 10/23/23 | Unconditional stability | | 5 |
| 27 | W | 10/25/23 | Simultaneous Conjugate Match | 8 | |
| 28 | F | 10/27/23 | LTI networks | | |
| 29 | M | 10/30/23 | Properties of LTI Networks | | 6 |
| 30 | W | 11/1/23 | 1-Port Noise Characterization | 9 | |
| | F | 11/3/23 | Exam 2 | | |
| 31 | M | 11/6/23 | 2-Port Noise Characterization | | 7 |
| 32 | W | 11/8/23 | Noise Factor and Noise Figure | 10 | |
| 33 | F | 11/10/23 | Mixers | | |
| 34 | M | 11/13/23 | Conversion Loss in Mixers | | 8 |
| 35 | W | 11/15/23 | Two-tone input | 11 | |
| 36 | F | 11/17/23 | Modeling Nonlinearities | | |
| | M | 11/20/23 | Thanksgiving Week – NO CLASS | | |
| | W | 11/22/23 | Thanksgiving Week – NO CLASS | | |
| | F | 11/24/23 | Thanksgiving Week – NO CLASS | | |
| 37 | M | 11/27/23 | Phase-Locked Loops | | 9 |
| 38 | W | 11/29/23 | Transient Response of PLL's | 12 | |
| 39 | F | 12/1/23 | FM Demodulation | | |
| 40 | M | 12/4/23 | Frequency Synthesis with PLL's | | |
| 41 | W | 12/6/23 | Phase Detectors | | |
| | M | 12/11/23 | Final Exam | | |