

## Syllabus for EE 421/621

Electrical Engineering Department

Wright State University

Winter 1995

5:00-6:50; M, W; 144RC

**Course Title :** Communication Theory

**Pre-requisite :** EE-322

**Text :** *Introduction to Communication Systems*, 3rd Ed., by F. G. Stremler

**Suggested Reference :** *Modern Digital and Analog Communication Systems*, 2nd Ed., by B. P. Lathi

**Course Objectives :** The present era has often been proclaimed as the “**Communication Age**”. Everywhere in the world we find ever growing millions are communicating using radio, TV, telephone, wireless, cellular microwave-link, fiber-optic link, satellite, video and etc.. The so-called “Information Superhighway” has already become a common lingo in the popular media. Now the questions are : (i) how does ‘information’ travel through the ‘highway’? (ii) what types of communicating systems make this really happen? (iii) what theoretical principles are these systems based on? (iv) what is the best available technology for a given application? (v) how can we suppress the inevitable noise/interference in the signals? (vi) what kinds of communication systems future societies will use? Finding the answers to these important questions are not always easy, because much of details would eventually rely on intricate knowledge of a combination of mathematics, physics, electronics, software as well as hardware. But indeed, these are the exciting challenges that face today’s budding Electrical and Computer Engineers and this course sequence (EE421-473-474-476) aspires to propel the students a long way into this mindblowingly fast-paced and ever-changing world of Electronic Communications.

**Course Sequence :** EE-421/621 is the first course in the Communication sequence. In this course we mainly focus on the mathematical fundamentals. Modern and practical systems are dealt with in the later two courses. In EE-473/673 reviews probability and random process theory to prepare for analyzing noise effects on different communication systems. Each student also designs and builds AM/FM receiver circuits in the Laboratory and prepare a Library research paper/report on a modern topic of the student’s own choice. In EE-474/674 covers Nyquist Signaling, Equalization, Information Theory and Coding. Different communication hardware/software are also built by different groups of students. The final course in the sequence EE-476/676 is almost entirely project oriented which includes a problem definition stage, an analysis and design stage as well as final implementation stage.

**Grading Procedure :**

- 10% : Homework problems (3-5) will be due each week. Two lowest grades will be dropped for each student
- 5% : Class quizzes (Unannounced)
- 20% : First Mid-term, Chapters 2 and 3 (January 30th, tentative)
- 25% : Second Mid-term, Chapters 5 and 6 (Mar. 1st, tentative)
- 40% : Final, Comprehensive. (5:30-7:30 PM, Friday, Mar. 17th)

**Course Topics :**

- Overview of Fourier Analysis (Chapter 2 (part))
- Fourier Transform - Theory and Applications (Chapter 3)
- Sampling and Aliasing (Chapter 3)
- Amplitude Modulation - Double sideband and Single sideband Systems, Demodulation and Diode Detector, Superheterodyne (Chapter 5)
- Angle Modulation - Frequency Modulation (FM), Phase Modulation (PM), Demodulation (Chapter 6)
- Pulse-Amplitude Modulation, Pulse-Code Modulation, Pulse-Width Modulation and Pulse-Position Modulation (Chapter 7)

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**Office Hours**

| Tue          | Wed          | Thu          |                    |
|--------------|--------------|--------------|--------------------|
| 3:30–5:00 pm | 3:30–4:30 pm | 3:30–5:00 pm | and by appointment |