ECE421 Course Syllabus

1. Course number and name
   ECE421 Data Communications

2. Credits and contact hours
   3 credits

3. Instructor's or course coordinator's name
   Dr. Yun Q. Shi

4. Text book, title, author and year
   Modern Digital and Analog Communications, 4th edition
   B. P. Lathi and Zhi Ding, ISBN-10: 0195331451 | ISBN-13: 978-0195331455

5. Specific course information
   a. brief description of the content of the course (Catalog Description)
      The course is designed mainly for Computer Engineering students as the first course in communications. After this course, the students are supposed to have a basic understanding about digital data communication systems. It covers the following material.
      Fundamentals: Introduction, Fourier Techniques (series and transformation), Signal Analysis and Linear Systems (unit impulse signal, signal's energy and power, energy signal, power signal, ESD, PSD, correlation, orthogonal signal, ideal and practical filters), Information Theory and Huffman Coding
      Analog Communications (very briefly): Linear Modulation (AM), Exponential Modulation (FM)
      Digital Communications Sampling, Quantization, Pulse Modulation (PAM, PCM, PWM, PPM, DPCM, DM; detection), Carrier Systems (ASK, FSK, PSK, DPSK; detection), Line Coding, Scrambling, Detection and Error Probability, M-ary Communications
   b. prerequisites or co-requisites
      ECE232, Math333 or ECE321
   c. indicate whether a required, elective, or selected elective

6. Specific goals for the course
   a. The student will study Fourier transform, sampling and quantization, principles and major parts of digital data transmission, and some fundamentals of information theory including Huffman coding. Consequently they know how a digital communication system works. Hence, they are prepared to take future job in digital communications.
   b. The student outcomes in Criterion 3 (a), (b), (c), (d), (e), (i) and (j), listed below, are addressed by the course. (a) an ability to apply knowledge of mathematics, science, and engineering; (b) an ability to design and

conduct experiments, as well as to analyze and interpret data; (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability; (d) an ability to function on multidisciplinary teams; (e) an ability to identify, formulate, and solve engineering problems; (i) a recognition of the need for, and an ability to engage in life-long learning; (j) a knowledge of contemporary issues

7. Brief list of topics to be covered

Weekly schedule:

- Weeks 1 - 6. Chapters 1, 2 and 3, followed by problem solving on blackboard.
- Week 7. 1st quiz and Chapter 6.
- Weeks 8 and 10. Chapter 6 and Chapter 14 (or Chapter 15 in 3rd edition), followed by problem solving on blackboard.
- Week 11. 2nd quiz and start Chapter 7.
- Weeks 12 - 15. Chapter 7 and the problem solving on blackboard.
- Week 16. Final exam

Quiz/Exam schedule:

- 1st quiz is held after Chapters 1, 2 and 3 in late February (or the early March).
- 2nd quiz is held after Chapters 6 and 14 (or 15 for 3rd edition) in late March.
- Final exam is held after Chapter 7 at the end of semester.