

# EE392AA – Advanced Digital Transmission

(previously known as EE379C)

- Instructor:** John M. Cioffi (Hitachi America Professor Emeritus)
- Time:** Spring Quarter, lectures twice weekly (3 credits)  
Weekly problem session with teaching assistant(s)
- Text:** Distributed text (at course web site)
- Description:** This course will develop insights into fundamentals and design of state-of-the-art physical-layer transmission systems. Specific attention will be paid to transmission in non-ideal environments with limited spectra and spatial interference. A theory of parallel channels is used to develop multi-carrier methods, vector coding, and generalized decision-feedback approaches. Students will be expected to design and analyze performance of systems operating close to fundamental limits for a variety of practical channels, wireline or wireless.
- Pre-requisites:** EE379 or equivalent, understanding of probability, random processes, digital signal processing (including basic matrix and matlab skills)
- Topics:** Basic multi-tone and parallel sub-channel transmission methods, water-filling, and loading algorithms; channel partitioning, vector coding, theory of equivalent transmissions, fair comparisons, design for severe inter-symbol interference and/or crosstalk. Generalized equalization theory and decision-feedback for single and multiple input/output channels. Use of Stanford matlab design package, limiting results, and Toeplitz distribution.
- Goal:** Prepare interested students for high demand, locally and globally for strong transmission designers in the communication industry.