



Class Project

- You will propose and carry-out a semester-long project
 - 30% of Final Grade
- Will require computer simulation (preferably Matlab but you may choose your own simulation environment)
- Work as individual or in small groups (1-4 people)
- Purpose
 - Provide you with research experience
 - Improve communication skills
 - Provide examples of the kinds of problems in Digital Communications



Important Project Dates

- February 3: Project Proposals Due
- April 16: Oral Project Presentations
 - Digital Communications “Mini-Conference”
- April 28: Written Projects Due
- Project Grading
 - Communication skills (oral and written) 25%
 - 10% from presentation and 15% from report
 - Technical accuracy 25%
 - 5% from presentation and 20% from report
 - Completeness in results (based on proposal) 30%
 - 10% from presentation and 20% from report
 - Conclusion (what do your results show?) 20%
 - 5% from presentation and 15% from report



Proposal

- All project topics are up to the student to decide. However, they must be approved. In order to obtain approval there must be a project proposal.
- Due date - February 3, 2004
- Format
 - 1-2 pages
 - Topic (1 paragraph background) ,
 - Objective (what do you plan to examine?)
 - Approach (how will you attack the problem?)
 - Expected results (what key results will determine your outcome?)



Topics

- You are given wide latitude to choose your topic
- You can choose any topic which is relevant to digital communications
- Examples:
 - Compare OFDM with Equalization of single carrier systems
 - Space-time coding
 - Continuous Phase Modulation
 - Low-density Parity Check Codes
 - Channel estimation techniques for fading channels
 - Channel estimation error with Space-Time Trellis Codes



Topics (cont.)

- You may also choose a more advanced topic (something that may be useful in your thesis)
- Examples of projects that might lead to theses or conference papers:
 - Optimal power profiles for Successive Interference Cancellation receivers
 - Resource control with multi-antenna systems
 - Adaptive modulation for OFDM systems
 - Power control for MIMO-based V-BLAST systems
 - Differential space-time block coding vs. coherent STBC
 - Multiple Access Schemes for MIMO



Simulation

- Simulation is a major part of research as well as communication system design
- This project will give you the opportunity to obtain valuable research experience
- I have created a document (which is on the web page) that describes how to calibrate your simulation for AWGN.
- I will also post Matlab functions that can be helpful (e.g., Rayleigh fading, PSK modulation)
- If you have never done simulation work, try asking your colleagues. If that is not helpful, please see me.