

# EE 521 Instrumentation and Measurements

Fall 2006 - Dr. Anders M. Jorgensen

## Research paper

The research paper component of the course will account for 15% of your final grade. It will consist of a paper up to 20 pages long and a 30 minute oral presentation.

**Logistics:** You may turn in your paper anytime you want during the semester and schedule your presentation with me during regular class at a mutually agreeable time after you turn in your paper. Please discuss your chosen topic with me as early as you can during the semester so that I may try to minimize overlap between your papers. Also feel free to discuss your paper with me during the semester if you require advice on formatting and scope. Although you are free to choose the time you hand in your paper, practical considerations limit how late you may turn in your paper. If no one gives a presentation early then the last day to turn in your paper will be November 20, with the first presentation starting November 22.

**Objective:** The objective of the research paper is to allow you to perform independent research on a sensor system or sensor mechanism, to put to use the methods and knowledge that you acquire in this course, and to practice your research, organization, writing, and presentation skills.

**Paper:** The paper should be up to 20 pages in length, double-spaced. You may include figures as additional pages, or include them in the 20-page count as you see fit. The 20 page maximum is intended as an upper limit to your writing. If you are able to complete a thorough discussion of your chosen sensor system in less space that is fine with me (but please be sure that it is a thorough discussion in that case). Possible aspect that you may want to cover include, but are not limited to, descriptions of

1. the quantity that the sensor or sensor mechanism measures.
2. the underlying physical mechanism of the sensor system or sensor mechanism.
3. how the sensor or sensor mechanism is used in a measurement system.
4. the relevant electronic circuits and derivation of transfer functions.
5. alternative methods for measuring the same quantity or similar quantities.
6. trade-offs between the chosen sensor and other sensor systems, in terms of cost (money, operations time, and analysis time), precision, accuracy, and complexity.
7. concluding remarks and recommendations.

Please structure the paper for easy reading by sectioning it with relevant headings.

**Presentation:** You should prepare a presentation based on your research paper. It should be approximately 30 minutes long. I recommend a power point presentation, but you are free to choose your format.