ECE 510 Instrumentation and Measurement I Study Guide #1 January 7 2013

Quote of the Week, from Claerbout, preface to Imaging the Earth’s Interior

“Are you aged 23? If so, this book is designed for you. Life has its discontinuities: when you enter school at age 5, when you leave university, when you marry, when you retire. The discontinuity at age 23, mid graduate school, is when the world loses interest in your potential to learn. Instead the world wants to know what you are accomplishing right now! This book is about how to make images. It is theory and programs that you can use right now.”

Tasks for this week:

Noise and Dimensional Analysis--commit the following to memory, including dimensions: Boltzmann’s Constant, Room Temperature in Kelvin, Liquid Nitrogen temperature, CMB temperature, SI dimensions for Pascals, Joules, Watts... SPL in dB relative to what? Conversions from watts to energy to various dB forms.

Homework:

On one page, collect a set of natural background noise (noise floor) numbers for various thermal, acoustic, electrical, magnetic, and electromagnetic environments. Commit them to memory, and start using each of them in back-of-the-envelope calculations.

Study Material:

Use the web, with a strong nonsense filter in place. Bookmark useful sites on background noise to share with the class.

Next Graded Exercise

Wednesday January 9  Expect an anonymous and ungraded exercise starting with a blank sheet of paper, with questions about noise, physics, and great equations of time and space.