

ECE-530, SENSOR ENGINEERING

INSTRUCTOR: DR. K. HINTZ

If you deal with the real world in order to either understand it or control it, you need to know how to observe it. Observations are processed to create measurements; measurements are processed to create estimates, and estimates are used to extract information from the environment. This course will provide you with the basic understanding of different physical observables, the sensors used to observe them, and the methods of inputting these observations into your electronic system.

The objective of the course

Develop an understanding of the relationship among observables, the mechanisms for making measurements of observables, the limitations imposed by conversion from reality to a representation of reality, and the estimates derived from measurements

Sensors studied

A variety of representative sensing modalities will be studied including acoustic sensors, thermal sensors (point and imaging), non-ionizing electromagnetic radiation (RF and Radar), ionizing radiation (x-rays), and chemical/biological sensors. If you have an interest in a particular type of sensor, we can modify the syllabus to incorporate that sensor. If you have a work related interest in a particular type of sensor and with the prior permission of the instructor, you may submit a semester long, original report on the sensor or some aspect of the sensor to be graded in lieu of taking the final exam (in the format of an IEEE paper with references).

Converting observables into data

The transducers which convert the sensed observable into electrical signal, either voltage or current, will also be introduced. This involves understanding transfer functions and the essential non-linearities inherent in many transducers.

Instructor Fall 2016

Dr. Hintz holds 22 issued patents (many related to sensors and signal processing), 9 patents pending, is a Fellow of SPIE, a Senior Life Member of IEEE, and lead author on a book on Microcontrollers.

Dr. Hintz' is currently funded by the Navy Postgraduate School to continue studying his method of information based sensor management.

Dr. Hintz' recently developed a patented method for *pre-shot* detection of barreled weapons based on his discovery of cavity induced modulation (CIM).

His other research interests are in image processing of ground penetrating radar, X-ray, thermal, and visual data.