**Course Topics**

**EEE 527: Analog-to-Digital Converters**

**Prerequisites:** EEE 523

**Catalog Course Description:** This course provides a detailed introduction to the design of Nyquist-rate CMOS analog-to-digital converters (ADC) and digital-to-analog converters (DAC). The Nyquist ADC architectures including Flash, Sub-ranging, Pipelined, Folding/Interpolating, Interleaved, Algorithmic, Integrating, and Successive Approximation are introduced. Extensive use will be made of matlab and spice to model ADC behavior and operation. Detailed designs of cyclic and pipelined RSD ADCs will be covered in class and completed in three projects.

**Course Topics:**

ADC characterization/test

sampling theory and related issues

Nyquist-rate ADC architectures

* successive approximation register (SAR)
* flash
* sub-ranging
* folding/interpolating
* pipelined
* cyclic

time-interleaved ADCs

switched-capacitor circuit design and analysis

detailed pipelined/cyclic ADC design

* architecture optimization
* correlated-double-sampling
* correlated-level-shifting
* performance limitations/circuit issues
* ADC modeling techniques
* MDAC architectures

DAC architectures and implementation issues