Course Topics

**EEE 598: Structural VLSI Analog Circuit Design Based on Symmetry**

**Prerequisites:** EEE 433, 523, 525 (recommended) and basic knowledge in VLSI devices and analog circuits

**Catalog Course Description:** VLSI analog circuit design; translation, reflection, rotation and electrical symmetry circuit structures; symmetry principle and low PVT sensitivity design methodology; ratio based design and digital based analog circuit techniques; structural design of VLSI analog circuits, such as opamp, bandgap, and phase locked loop circuits. Fundamental of VLSI spatial signal processing.

**Course Topics:**

- Symmetry Principle
- Symmetry Structures in VLSI Analog Circuits
  - VLSI Reflection, Translation, and rotation Symmetries
  - VLSI Electrical Symmetries
- Symmetry Design Methodology
  - Spatial Signal Processing (SSP) and Symmetry Computing
  - Symmetry Scaling and Transformations
  - Symmetry for Low PVT Sensitivity VLSI Circuit Design
  - Ratio Based Design and Digital Based Analog Circuit Techniques
- Structural VLSI Analog Circuit Design Based on Symmetry
  - VLSI Physical Design
  - Opamp Circuit Design
  - Bandgap Circuit Design
  - Filter Circuit Design
  - Parameter Tuning Circuits
  - PLL Circuit Design
  - Data Converter Circuits Design
  - Fuzzy Logic and Neural Network Circuits