

ECEN 650 : HIGH FREQUENCY IC DESIGN

- Spring 2008
MWF 09:10AM-10:00AM ZACH 223D
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- **Reference Books:**
 - *High-Frequency Analog Integrated Circuit Design*, R. Goyal, John Wiley & Sons, 1995.
 - *GaAs High-Speed Devices*, C. Y. Chang and F. Kai, John Wiley & Sons, 1994.
 - *SiGe, GaAs, and InP Heterojunction Bipolar Transistors*, J. S. Yuan, John Wiley & Sons, 1999.
 - *Silicon-Germanium Heterojunction Bipolar Transistors*, J. D. Cressler and G. Niu, Artech House, 2002.
 - Selected publications
- **Grading:**
 - Exam(s) : 30%
 - Final Project: 40%
 - Laboratory : 30%
- **Course Outline:**
 - Background on Microwave Transistors
 - * Basic concepts and operation principles
 - * Properties of MESFETs, HEMTs and HBTs
 - * Major applications
 - MESFETs, HEMTs and HBTs in GaAs and SiGe technologies
 - * DC and small-signal models
 - * Noise & power analysis
 - Basic Building Blocks
 - * Biasing of GaAs MESFET/HEMT circuits
 - * Current mirrors
 - * Basic gain stages
 - GaAs/SiGe Applications
 - * Low-noise amplifiers and mixers
 - * Transimpedance amplifiers
 - * Power amplifiers (class A, B, AB, C, D, E)
 - High speed digital circuits and interfaces (CML, ECL, LVDS)
 - High Frequency Analog Filters
 - * Filter topologies
 - * Design procedures
 - * Automatic tuning & calibration techniques