ECEN 625: MILLIMETR-WAVE INTEGRATED CIRCUITS

- **Spring 2014:** TR 5:30 pm-6:45 pm ZACH 223C

- **Instructor:** Kamran Entesari  
  **Office Hours:** TR 10:00 am-11:00 am  
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- **Prerequisite:** Graduate standing; Approval of the instructor

- **References:**  
  (1) *mm-wave silicon technology, 60 GHz and Beyond*, A. M. Niknejad, and H. Hashemi, Springer 2008,  
  (2) Papers in the field

- **Description:** Traditionally, monolithic microwave integrated circuits (MMICs) have been designed using III-V semiconductors, such as GaAs and InP, which have superior performance compared to CMOS and SiGe technologies and are more expensive. Due to huge commercial interest to wireless communications at mm-wave frequencies, novel system and circuit ideas using cheap and highly integrated CMOS and SiGe circuits for wireless transceivers have been developed in recent few years.

- **Learning Outcomes:** This is a graduate level course on the principles and applications of millimeter-wave integrated circuits for wireless transceivers. The principles of operation, modeling, design and fabrication of the most common millimeter-wave CMOS, SiGe circuits will be discussed.

- **Grading Policy:**  
  (1) Homework: 60%, (2) Final Project: 40%

- **Topics to be covered:**
  1. Introduction to mm-wave silicon devices, circuits and systems  
  2. Silicon technologies to address mm-wave solutions  
  3. Design and modeling of passive and active devices  
  4. Low-noise amplifiers and mixers  
  5. VCOs, frequency dividers and synthesizers  
  6. Power amplifiers

- **Americans with Disabilities Act (ADA) Policy Statement:**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

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