EE 5349 SECTION 001   RFIC DESIGN FOR WIRELESS COMMUNICATIONS
Spring 2004
M W 9:00-10:20 am, GACB 105

1. **Instructor:** Enjun Xiao Ph.D.                     Office: 534 NH
   Office Hour: M W 10:30 am-13:00 pm    Phone: 817-272-3451
   Email: exiao@uta.edu

2. **TAs:**
   a. Sridhar Mukalla Email: smukalla_78@yahoo.com    Tel: 817-274-9845
   b. Chen Liao Email: liaochen6288@yahoo.com         Tel: 817-251-2561

3. **Course website:** [http://www-ee.uta.edu/online/xiao/ee5349](http://www-ee.uta.edu/online/xiao/ee5349)

4. **Course Prerequisites:** EE5305 Advanced Electronics, EE5318 Analog CMOS IC Design, or concurrently. MOSFET transistor properties and operations, analog circuit design and analysis, basic electromagnetism, Fourier analysis and wireless communications.

5. **Textbook and References:**
   c. IEEE journal and conference papers

6. **Course Description:**
   This course covers the design techniques relevant to today’s advanced CMOS RF IC for wireless communications. Students will learn how to design RFIC using Cadence. The projects cover the whole design process, including simulation and layout. The contents include:
   - Introduction: Frequency up- and down-conversion, wireless communication standards, CAD tools and a first look at wireless RF transceivers.
   - Fundamental RF design issues: nonlinearity, selectivity, sensitivity, and dynamic range, etc.
   - Transceiver architectures, emphasizing their advantages and drawbacks with respect to monolithic integration.
   - MOSFET and related noises.
   - Low noise amplifiers
   - Mixers
   - Oscillators
   - Frequency synthesizers
   - Phase locked loops
   - Power amplifiers

7. **Simulation and design tool:**
   Cadence is an industry standard CAD tool for analog, mixed-signal, RF, and high-speed IC design. All the simulation and design problems in assignments and projects will require use of Cadence. There will be two tutorial sessions about the usage of Cadence. Each student needs a personal account for workstations in EELAB 212. To get an account on GAMMA 2 Server, you need to send email to helpdesk@uta.edu.

8. **Grading:**
   Grading will be based on homework, quizzes, exams and projects.
   Homework: 20%; Quizzes: 10%; project: 40%; Final exam: comprehensive 30% (Wed., May 12, 8-10:30 am).
   Grading scale: 90-100 A, 80-89 B, 70-79 C, 60-69 D, 59 and below F.
   Quizzes may be given without warning.
   **Late grading policy:** If you miss an exam/quiz, you will receive a grade of zero (exceptional circumstances must be documented and/or approved by the instructor at least 24 hours prior to the exam). Late homework will get 10% off each day.
   **No work is allowed to be shared between individuals or groups.**
Project: Each project group is composed of up to five students. Each project is to design a block in the transceiver for some specific standard using Cadence. The blocks include LNA, mixer, oscillator, frequency synthesizer, PLL, frequency divider, various filters or PA. All the projects need to finish the whole design process, including circuit simulation and layout (DRC, LVS), and will be shown in the lab. Every student in the group needs to make his/her own contributions.

Project deadlines:
- group and topic: Feb. 18, approved by the instructor;
- simulation report: hard copy, from April 14 to Apr. 26;
- project report: electronic version (MSWord) and hard copy, May 5th;
- presentation: 20 minutes for each project in the last 2 weeks, ppt file, in the lecture order.

9. Attendance Policy: Attendance at every class session is strongly advised.

10. Drop Policy: As per University guidelines. See the Registrar’s Bulletin or the University Calendar in the front part of the UTA catalog for drop dates.

11. Student Evaluation of Teaching
   Students will be asked to complete instructor/course evaluation forms at the end of the semester.

12. Americans with Disabilities Act:
   The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112—The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act – (ADA), pursuant to section 504 of The Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

   As a faculty member, I am required by law to provide “reasonable accommodation” to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

   If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are properly accommodated.

13. Academic Dishonesty
   It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

   “Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.” (Regents’ Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22).

   ANY CHEATING WILL RESULT IN SEVERE PENALTIES.

   The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. They include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

14. This syllabus may be changed by the instructor as needed for good academic practice.