Class Period and Location: Tuesday 2nd and 3rd periods, 8:30am to 10:25am, Thursday 3rd Period 9:35am to 10:25am, Section 078H, 315 Black Hall (Behind of NEB to the South).

Office Hours: Tuesday: 10:30am to 11:45am and Thursday 10:30am to 11:45am.

TA: TBA contact details on Sakai


Free Learning Modules:
http://www.rfcafe.com/references/electrical/NEETS%20Modules/NEETS-Module-10-1-1-1-10.htm


Course Materials: I will be using the Syllabus to index of the daily class materials posted for you to review and to learn from. So, you can find most learning materials by clicking on a link from the Syllabus. I try to post all written materials and video materials used in the lectures to assist in your learning. I post several years of old quizzes or exams a week before the in class quiz. There will be folders that contain course materials (Course Notes, Old Exams, Cadence notes, In Class Notes, etc) in the Resources section of Sakai (see tabs on the left of this section).

Course Goals: Develop understanding of fundamentals of design and testing of RF integrated circuits operating at microwave frequencies.

Computer and Software Required:
Workstations with CADENCE Design system on campus, off-campus you can use X-Windows or X-terminal on a high-speed internet link to UF Campus Computers.
All students are required to have a Gator link account and use Sakai for course handouts, grade information, course notices, etc, see e-learning and Sakai

**Course Study Requirements:**
Students are responsible to study all in class materials including those written on the board and presented orally, all Class Handouts all assigned readings, all projects and homework. Absence from class can result in missing materials tested on exams.

**Work Requirements:**

Homeworks: 6-10 Homework Assignments  
Computer Laboratories and projects: 1 Design Project  
Exams: 3 Exams during the semester, No final Exam

**Examinations: (No Final Exam)**
Exam 1: Tentatively, Second week of February  
Exam 2: Tentatively, Third week of March  
Exam 3: Tentatively, Thursday April 18, 9:00am

**Make Up Exam Policy:** Students are expected to attend exams at the scheduled times. Exams can be made up if there is a genuine medical emergency with a doctor's or clinic medical note or a family emergency with some documentation.

**Grades will be on a curve and your relative statistical performance to the class average grades counts, not your absolute numerical performance.** For example, if you have a 91 average and the class median is 90 (not likely) you will get a B. You must be significantly better than average to get an A.

**Passing Grades and Grade Points Effective Summer A 2009**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D+</th>
<th>D</th>
<th>D-</th>
<th>E</th>
<th>WF</th>
<th>I</th>
<th>NG</th>
<th>S-U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Points</td>
<td>4.0</td>
<td>3.67</td>
<td>3.33</td>
<td>3.0</td>
<td>2.67</td>
<td>2.33</td>
<td>2.0</td>
<td>1.67</td>
<td>1.33</td>
<td>1.0</td>
<td>.67</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Preliminary Grading Policy:**
Homework and Projects - 25%  
Exams - 75%

**Academic Honesty:**
All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action.
This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide documentation to the instructor when requesting accommodation.
Course Outline (Subject to change): Note classes are on Tuesdays and Thursdays

Weekly Date, (No. of Classes) Class topics,
01/7, (3) Introduction, Two Port Networks (Lec. 1), Transmission Lines (Lec. 2 and 3).
01/14, (3) Transmission Lines (Lec. 4, 5 and 6)
01/21, (2) S-parameters (Lec. 7, 8 and 9)
01/28, (3) Smith Chart (Lec. 10, 11 and 12)
02/4, (3) Impedance Matching (Lec. 13), Network analyzer (Lec. 14), Network Analyzer Laboratory
02/11, (3) MOS Characteristics (Lec. 15), Quiz 1, MOS Cross-section (Lec. 16)
02/18, (3), Inductor Modeling (Lec. 17, 18 and 19)
02/25, (3) Package modeling (Lec. 20), LNA overview (Lec. 21 and 22)
03/04, Spring Break, no classes
03/11, (3) LNA Design (Lec. 23, 24 and 25)
03/18, (3) LNA Design (Lec. 26), Output matching (Lec. 27), Input Matching (Lec. 28)
03/25, (3) Quiz 2, Input matching (Lec. 29), LNA Output Matching (Lec. 30)
04/01, (3) LNA Output Matching (Lec. 31), LNA power gain (Lec. 32) LNA noise analysis (Lec. 33)
04/08, (3) LNA noise factor (Lec. 34), Trans. sizing (Lec. 35), Linearity (Lec. 36)
04/15, (3) Linearity (Lec. 37), Stability (Lec. 38), Quiz 3
04/23, (2) Substrate effects (Lec. 39), Other RF blocks (Lec. 40)
No Final Exam.

Topics and Reading assignments

Lecture 1 Introduction, 2-port network, Transmission ; Lee Chapter 6, HP App Note 16 (Gonz. 1.1-1.3)

Lecture 2 Transmission line, structure and design curves, Lee Chapter 6, HP App Note 16, (Gonz. 1.1-1.3)

Lecture 3 Voltage and currents in a transmission line, Lee Chapter 6, HP App Note 16, (Gonz. 1.1-1.3)

Lecture 4 Reflection coefficient, transmission line example, Lee Chapter 6, HP App Note, 16, (Gonz. 1.1-1.3)

Lecture 5 Transients in transmission lines (handout), HP App Note 62

Lecture 6 Transients in transmission lines (handout), HP App Note 62

Lecture 7 Scattering parameters (definitions), Lee Chapter 7, HP App Note 95 (Gonz. 2.1-2.3)
Lecture 8 Scattering parameters (2-port definitions) Lee Chapter 7, HP App Note 95 (Gonz. 2.1-2.3)

Lecture 9 Generalized Scattering parameters (handout)

Lecture 10 Smith Chart (defining equations) Lee Chapter 7, HP App Note 95 (Gonz 2.4-2.5)

Lecture 11 Transmission line on a Smith chart, Y-chart, Z-Y chart, Wikipedia link, Maxim App note 742, (Gonz. 2.4-2.5)

Lecture 12 Representation of capacitances and inductance on Z-Y chart, Wikipedia link, Maxim App note 742, (Gonz. 2.4-2.5)

Lecture 13 Matching network (quantitative analyses) Wikipedia link, Maxim App note 742, (Gonz. 2.4-2.5)

Lecture 14 Network analyzer(handout, Gonz. 1.9)

Lecture 15 MOS transistor review, Lee Chapter 5, (handout)

Lecture 16 MOS transistor cross-section, Lee Chapter 5 (handout)

Lecture 17 Inductor overview, Lee Chapter 4 (handout)

Lecture 19 Skin effects and inductor Q, Lee Chapter 4 (handout)

Lecture 20 Package model (handout)

Lecture 21 LNA overview (power gain) Lee Chapter 9 (handout)

Lecture 22 LNA overview (power gain) Lee Chapter 9 (handout)

Lecture 23 LNA overview (linearity) Lee Chapter 9 (handout)

Lecture 24 LNA overview (noise) Lee Chapter 9 (handout)

Lecture 25 LNA overview (noise, input and output matching) Lee Chapter 9 (handout)

Lecture 26 LNA overview (input and output matching) Lee Chapter 9 (handout)

Lecture 27 LNA output matching topology Lee Chapter 9 (handout)

Lecture 28 LNA input matching with emitter degeneration Lee Chapter 9 (handout)

Lecture 29 LNA input matching of a cascode amplifier Lee Chapter 9 (handout)
Lecture 30 LNA output matching design, Lee Chapter 9 (handout)
Lecture 31 LNA output matching design, Lee Chapter 9 (handout)
Lecture 32 Power gain of a cascode LNA, Lee Chapter 9 (handout)
Lecture 33 Noise in a cascode LNA, Lee Chapter 12 (handout)
Lecture 34 Noise factor, Lee Chapter 12 (handout)
Lecture 35 Transistor sizing, Noise parameters, Lee Chapter 11
Lecture 36 Linearity, Lee Chapter 12, (handout)
Lecture 37 Linearity, Lee Chapter 12, (handout)
Lecture 38 Stability of an amplifier (handout)
Lecture 39 Effects of substrate resistance (handout)
Lecture 40 Other RF blocks (handout)