

ECE145A/ECE218A Course Schedule¹ WINTER 2008

| <u>I. Transmission lines and two port s-parameters (3 wks)</u> | <u>Date</u> | <u>Activity</u> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------|
| 1. Introduction and lumped components at RF. R, L, C, Q | 1/7 M | Read Leeson (Stanford) Chap. 1 or Bowick pp. 9-30 |
| 2. Transmission lines structures, ideal and lossy lines forward & reflected waves, reflection coefficient terminations: load, short, open transmission coefficient at source; between trans. Lines | 1/9 W | Read G. 1.1-1.6, 1.9 Read G. 2.1 – 2.3; |
| 3. Transmission lines Position dependence of Z, gamma Smith Chart - plot Z on chart Quarter-wave line example | 1/11 F | Friday Lecture Read: ADS Tutorial: Basics LAB 1 Assigned |
| 4. Transmission lines: Admittance chart Two port parameters (y, z, h, and s-parameters) | 1/14 M | After Lecture (2-3:30PM): - Network analyzer orientation |
| 5. Matching network examples Impedance Matching Techniques L network | 1/16 W | Read G. 2.4 Alt. ref: Bowick, Chap. 4 |
| HOLIDAY | 1/21 M | Dr. ML King, Jr. Day |
| 6. Matching networks distributed matching networks | 1/23 W | Read G. 2.5 |
| <u>II. Performance Limitations of Amplifiers (2 wk)</u> | | |
| 7. Performance limitations part 1: distortion Gain compression, IMD, HD, Intercept point IP cascading, | 1/25 F | Friday Lecture |
| 8. two-tone simulations, HB tutorial; intro to spectrum analyzer Lab 2 information | 1/28 M | LAB 1 Due; LAB 2 Assigned. Read: Harmonic Balance Tutorial |
| 9. Performance limitations part 2: noise sources of noise; noise models Signal-to-noise ratio; noise figure; noise bandwidth, NF cascading; noise temperature. MDS, SFDR | 1/30 W | |
| NO CLASS | 2/4 M | |
| <u>MIDTERM EXAM</u> | 2/6 W | In Class |

¹ This represents my best guess for the syllabus at this time. It is entirely possible that changes will be made during the quarter.

III. Amplifier Design (3 wks)

10. Amplifier design (2 port parameter approach) 2/11 M Read G. 2.6 – 2.8; 3.1 – 3.3
 stability analysis, circles,
 stabilization methods
 VSWR and gain definitions
11. input and output match, gain circles 2/13 W Read: Gain and Stability Tutorial
 unilateral approximation

2/15 F **LAB 2 Due 145a.**
 LAB 3 Assigned.

HOLIDAY

2/18 M President's Day

12. bilateral case, conjugate match conditions 2/20 W Read G. 3.4 – 3.7, 3.9
 max. stable gain, G_p circles.
 bias circuit design, matching circuits,
 wideband stability analysis,

LAB 2 Due 218a.

13. Implementation issues. Testing of amplifiers 2/25 M Read: ADS Noise Figure Tutorial
 Design of low noise amplifiers:
 Two port noise parameter approach
 sources of noise; noise and G_a circles;

14. ADS noise modeling; noise figure measurements 2/27 W

IV. Intro to receivers (2 wks)

15. Receiver system basics 3/3 M
 Free space radio propagation model
 mixers: frequency conversion; channel selection
 Image rejection

16. Receiver system architectures 3/5 W
 single and dual conversion
 direct conversion vs. superhet vs. low IF

17. Mixer basics 3/10 M **LAB 3 Due.**
 switching vs. nonlinear mixing
 balancing to reduce spurs
 Diode and FET passive mixers

18. Active mixers 3/12 W
 DSB and SSB noise figure
 Gilbert cell double balanced mixer

Q/A session for review for final. 3/14 **FRIDAY**

FINAL EXAM

3/19 W 12 – 3pm