

Course web page: Blackboard

Class meets TTh 11:00-12:30 in RAS 211A

Unique No. 17310

Professor: Hao Ling
Office : ENS 622
Phone : 471-1710
e-mail : ling@ece.utexas.edu

Office Hrs: T 12:30-2:00
Th 12:30-2:00
all other times by appointment

Text: C. A. Balanis, *Advanced Engineering Electromagnetics*, Wiley, 1989.

Prerequisites: Graduate standing and consent of instructor.

Grading: 2 75-min. tests 50%
Homework (~11) 20%
3-hour final 30%

Course Outline: This is an introductory graduate course in electromagnetic field theory. We shall examine the fundamental solutions of time-varying Maxwell's equations in problems involving wave propagation, radiation and guidance. The following topics are planned:

1. Introduction and Review (Balanis Chaps 1, 2)
Maxwell's equations, charge conservation, Poynting's theorem, time-harmonic fields, constitutive relations, boundary conditions
2. Plane Wave Propagation (Balanis Chaps 3, 4, 5)
Solution to the source-free wave equation, plane waves, dispersion relation, waves in materials, polarization, reflection and transmission at media interfaces, Fresnel coefficients, total internal reflection, Brewster's angle
3. Radiation from Sources (Balanis Chaps 6, 7, 14)
Vector potentials, Green's function in 1D and 3D, solution to the inhomogeneous wave equation, near field and far field, electromagnetic theorems and principles, uniqueness, images, Huygens's principle, Lorentz reciprocity
4. Guided Waves (Balanis Chaps 8, 9)
Guided wave solution in cylindrical structures, TE/TM/TEM modes, parallel-plate/rectangular/circular waveguides, waveguides with arbitrary cross sections, mode orthogonality, attenuation of modes, waveguide excitation
5. Scattering (Balanis Chap 11)

Homework Policies:

- Homework will usually be assigned on Tuesday and due the following Tuesday by 2:00 pm in ENS 622.
- Solution will be posted on the course web page.
- The lowest homework score will be dropped in computing the final grade.
- **No late homework will be accepted. No excuses.**
- Show relevant steps and circle your final answer.
- You must do your own work. Copying other people's work or letting others copy your work is considered as scholastics dishonesty and will not be tolerated under any circumstances.

Exams:

- There will be 2 in-class exams and 1 comprehensive final.

Tentative Test Dates: Test 1 10/7
 Test 2 11/18

Final Exam: Friday, Dec. 12, 9 am -12 noon.

- You are expected to be present for every test. No make-up exams will be given.
- Additional office hours will be scheduled before each exam.
- Cheating will be dealt with in as severe a manner as possible. The minimum penalty for cheating is an 'F' in EE383L.