

Course Outline:

1. Introduction and Review (2 lectures)
Electromagnetic spectrum, Maxwell's equations, constitutive relations, Poynting's theorem, time-harmonic fields
2. Plane Wave Propagation (7 lectures)
Plane wave solution, dispersion relation, polarization, waves in materials, boundary conditions, reflection and transmission at media interfaces, Fresnel coefficients, Brewster's angle, total internal reflection
3. Antenna Theory and Design (11 lectures)
Radiation from sources, antenna parameters, wire antennas, aperture theory, horns and reflector antennas, phased arrays, Friis transmission formula, receiving properties of antennas, impact of antenna performance in communication links, radar principles
4. Numerical and Asymptotic Methods for Wave Propagation and Scattering (6 lectures)
Finite difference time-domain method, absorbing boundary condition, stability condition, geometrical optics, diffraction from knife edges, propagation channel characteristics for satellite and terrestrial communications

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.
- HW#10 is a numerical assignment to solve Maxwell's equations on the computer. For this assignment, you will need access to one of the following software: matlab, mathcad, C, Fortran or Basic compiler.
- The lowest homework score will be dropped in computing the final grade. The grade for the numerical homework (HW#10) will NOT be dropped, however.
- **No late homework will be accepted. No excuses.**
- Show relevant steps and circle your final answer.
- You should and 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 10/13
 Test 2 11/22

Final Exam: Thursday, Dec. 15, 9-12 am.

- 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 EE325K.