

ENG EC 455: Electromagnetics Systems I
Fall, 2009

Lecturer: Professor Min-Chang Lee
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PHO Rm. 520, 3x3363
Office hours: Tuesday & Thursday 4-5 PM

Teaching Fellow: Andrew Yang

Lectures: Tuesday & Thursday, 2-4 PM
in PHO Rm. 210

Textbooks: D. K. Cheng, "Fundamentals of Engineering Electromagnetics",
Prentice-Hall, 1993, ISBN: 0-201-56611-7 and Lecture Notes.

Exams: Mid-term examinations are scheduled on Thursday, Oct. 15 and
Thursday, Nov. 19, 2-4 PM in PHO Rm. 210.
Final exam will be scheduled and announced later.

Homework: Homework assignment will be issued on Tuesday or Thursday in
the class. It is due on the same day in following week in class.
NO LATE HOMEWORK WILL BE ACCEPTED.

Grading Policy: (1) Homework: 20%,
(2) Mid-term exam 1: 25%,
(3) Mid-term exam 2: 25%,
(4) Final exam: 30%.

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COURSE SCHEDULE

1. Sept. 3 **Introduction, electromagnetic model, units, 1.1 - 1.3.**
2. Sept. 8 **Vector analysis, time averages (lecture notes, Chap. 2).**
3. Sept. 10 **Vector analysis, time averages (lecture notes, Chap. 2).**
4. Sept. 15 **Overview, Faraday's law, 6.1 - 6.2.**
5. Sept. 17 **Maxwell's equations, EM boundary conditions 6.3.1 - 6.3.2.**
6. Sept. 22 **Potential functions, solution of wave equations, 6.4.**
7. Sept. 24 **Wave equations and solutions, time-harmonic fields, 6.5.**
8. Sept. 29 **Plane waves in loss-less media, 7.1 - 7.2.**
9. Oct. 1 **Plane waves in lossy media, group velocity, 7.3 - 7.4.**
10. Oct. 6 **Electromagnetic power and Poynting vector, 7.5.**
11. Oct. 8 **Normal incidence at a plane conducting boundary, 7.6.**
12. Oct. 15 **Mid-term exam I**
13. Oct. 20 **Oblique incidence at plane boundaries, 7.7.**
14. Oct. 22 **Transverse wave along a parallel-plate transmission line, general transmission line equations, 8.1 - 8.2.**
15. Oct. 27 **Transmission-line parameters, wave characteristics on infinite transmission lines, 8.3 - 8.4.**
16. Oct. 29 **Wave characteristics on finite transmission lines, 8.5.**

- 17. Nov. 3 Smith charts, 8.6.**
- 18. Nov. 5 Smith charts, 8-6.**
- 19. Nov. 10 Transmission line impedance matching, 8.7.**
- 20. Nov. 12 General wave behaviors along uniform guiding structures, parallel-plate waveguides, 9.1 - 9.2.**
- 21. Nov. 17 Rectangular waveguides, circular waveguides, 9.3.**
- 22. Nov. 19 Midterm exam II.**
- 23. Nov. 24 Dielectric waveguides, cavity resonators, 9.4 - 9.5.**
- 24. Dec. 1 Radiation fields of elemental dipoles, 10.1 - 10.2.**
- 25. Dec. 3 Antenna patterns and parameters, 10.3.**
- 26. Dec. 8 Thin linear antennas, antenna arrays, 10.4 - 10.5.**
- 27. Dec. 10 Effective area and backscatter cross section, 11.6.**
- 28. TBA Final exam.**