

Department of Electrical & Computer Engineering
The University of Kansas

EECS 721- Antennas

Fall, 2007

Description: Gain, Pattern, and Impedance concepts for antennas. Linear, loop, helical, and aperture antennas (arrays, reflectors, and lenses). Cylindrical and biconical antenna theory.

Prerequisites: EECS 420, 720, or equivalent.

Textbook: *Antenna Theory: Analysis and Design*, by Constantine Balanis

Course

Objectives: To introduce the fundamentals of antenna and array theory, including standard antenna performance parameters such as gain, beamwidth, impedance, bandwidth and polarization. To provide the electromagnetic knowledge required to determine the radiation pattern of standard antenna and array structures.

Prerequisites by Topic:

1. Vector Calculus
2. Electromagnetics and travelling wave theory

Course Topics:

1. Antenna fundamentals and definitions (gain, beamwidth, impedance, bandwidth, polarization).
2. Radiation
3. Linear Wire antennas
4. Wire loop antennas
5. Arrays
6. Broadband wire Antennas and matching techniques
7. Traveling wave antennas
8. Frequency independent antennas
9. Aperture antennas
10. Electromagnetic numerical methods
11. Antenna measurements

Outcomes: Students should be capable of:

- Understanding and specifying the fundamental parameters of an antenna, including gain, beamwidth, sidelobe level, bandwidth and impedance.
- Determine the radiation pattern resulting from a wire antenna with a given current distribution.
- Determine the radiation pattern resulting from an aperture antenna with a given aperture distribution.
- Determine the radiation pattern resulting from a given antenna array.
- Recognize the standard wire, aperture, reflector, and antenna array designs, and know the characteristics of each.

Computer Usage: MATLAB and Ansoft HFSS

Laboratory Projects: Antenna and array design project

Grading: The following percentages will be used to arrive at the final grade scores

Exam I	20
Exam II.	20
Final Exam.	20
Homework.	15
Projects	25

Final letter grades are determined from the above grade scores according to a scale that is dependent on the instructor's perception of the overall class performance vs. the difficulty of the exams, but will is often similar to the typical 90-100 A, 80-90 B, etc.

Homework: Homework will be collected at the beginning of class on a bi-weekly basis. Late homework is not accepted, except for unusual circumstances. Collaboration with classmates is permitted. Copying is *not* permitted and will be penalized.

Instructor: Kenneth R. Demarest

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Office Hours: 8:30 - 9:00 MWF (Eaton)

11:00 - 11:30 MWF (Eaton)

3:00 - 4:00 MWF (Eaton)

By Appointment TR (Nichols Hall)