

# ECE 929B: Antenna Theory

## Spring 2014

4:10 – 5:30 MW 1230 EB  
4:10 – 5:00 F 1202 EB

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Office hours: 11:30-12:30 MWF 2234 EB

Text: Antenna Theory and Design, Robert S. Elliott, John Wiley and Sons (IEEE Press Series on Electromagnetic Wave Theory), 2003.

Web site: Desire 2 Learn system (<https://d2l.msu.edu>)

Class Notes: Antenna Theory, by D.P. Nyquist. Class notes are available on D2L.

Grading:	Homework:	20%
	Exam 1:	30%
	Exam 2:	30%
	Exam 3:	20%

Course Outline -----

<u>TOPIC</u>	<u>TEXT</u>
1. The far-field integrals, reciprocity, directivity	Ch. 1
2. Radiation patterns of dipoles, loops and helices	Ch. 2
3. Linear Arrays: analysis	Ch. 4
4. Self impedance and mutual impedance of antenna elements	Ch. 7
5. Radiation patterns of horns, patches and slot antennas	Ch. 3
6. Frequency-independent antennas	Ch. 8
7. Reflectors and lenses	Ch. 10
8. The singularity expansion method (if time permits)	Notes

Exam 1.	February 24, 2014, 4:10-5:30 pm
Exam 2.	April 14, 2014, 4:10-5:30 pm
Exam 3.	April 30, 2014, 5:45-7:45 pm

**Policy on religious observances** – every attempt will be made to accommodate student needs. Any conflicts should be reported to the instructor as they are identified.

## **Suggested References**

*These references are available both within the EM Research Group and the MSU library system*

C.A. Balanis, Antenna Theory: Analysis and Design, New York : Harper & Row, 1982.

R.F. Harrington, Field Computation by Moment Methods, New York: MacMillan, 1968.

R.F. Harrington, Time-Harmonic Electromagnetic Fields, New York: McGraw-Hill, 1961.

R.W.P. King and C.W. Harrison, Antennas and Waves: A Modern Approach, Cambridge, Mass.: M.I.T. Press, 1969

S. Ramo, J.R. Whinnery, and T. Van Duzer, Fields and Waves in Communications Electronics, New York: Wiley, 1994.

V.H. Rumsey, Frequency-Independent Antennas, New York: Academic Press, 1966

E.J. Rothwell and M.J. Cloud, Electromagnetics, 2<sup>nd</sup> ed., Boca Raton, Florida: CRC Press, 2008.

S. Silver, Ed., Microwave Antenna Theory and Design, New York: McGraw-Hill, 1949.

W.L. Weeks, Antenna Engineering, New York: McGraw-Hill, 1968.

*These references are in the MSU library system*

R.E. Collin and F.J. Zucker, Antenna Theory: Parts I and II, New York: McGraw-Hill, 1969.

R.W.P. King, The Theory of Linear Antennas, Cambridge, Mass.: Harvard University Press, 1956.

S.A. Schelkunoff, Advanced Antenna Theory, New York: Wiley, 1952.

S.A. Schelkunoff, Antennas: Theory and Practice, New York: Wiley, 1952.

W.L. Stutzman and G.A. Thiele, Antenna Theory and Design, New York: Wiley, 1981.