School of Electrical, Computer and Energy Engineering

Ira A. Fulton Schools of Engineering

Arizona State University

EEE 641

Advanced Electromagnetic Field Theory – 3 hr. rec.

Text: ***Advanced Engineering Electromagnetics*** by Constantine A. Balanis

References: ***Time-Harmonic Electromagnetic Fields*** by R. F. Harrington
EM Waves and Radiating Systems by E. C. Jordan and K. G. Balmain
Field and Wave Electromagnetics by D. K. Cheng

Course Syllabus:
Cylindrical wave functions, waveguides and resonators; spherical wave functions and resonators; scattering from planar, cylindrical and spherical surfaces; Green's functions.

I.	Review	1
II.	Chapter 8 A. Rectangular waveguides B. Partially-filled waveguides C. Dielectric waveguide D. Artificial impedance surfaces C. Striplines D. Microstrips E. Coupling F. Spectral domain method G. Ridged waveguides	7
III.	Circular cross-section waveguides and cavities A. Circular waveguide B. Circular cavity C. Radial waveguides D. Dielectric waveguides and resonators E. Optical fiber cable F. Dielectric-covered conducting rod	3

IV.	Spherical transmission lines and cavities	2
	A. Spherical wave functions	
	B. Construction of solutions	
	C. Biconical transmission line	
	D. Spherical cavities	
V.	Scattering	10
	A. Scattering by planar surfaces	
	B. Cylindrical wave transformations and theorems	
	C. Scattering by circular cylinders	
	D. Scattering by conducting wedge	
	E. Spherical wave orthogonalities, transformations and theorems	
	F. Scattering by conducting sphere	
VI.	Green's functions	3
	A. Green's Functions in engineering	
	B. Strurm-Liouville problems	
	C. Two-dimensional Green's function	
	D. Green's functions of scalar Helmholtz equation	

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January 2, 2015