COURSE SYLLABUS FOR ESE 520
SPRING 2018

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RECOMMENDED BUT
NOT REQUIRED BOOK: **Ulaby, Michielssen & Ravaioli,**
Fundamentals of Applied Electromagnetics
(6th Edition), Prentice Hall, 2010

I. Wave phenomena and their importance in applied electromagnetics. Harmonic plane waves. Travelling and standing waves. Phase and group velocities. Dispersive and nondispersive propagation. Lossy propagation.

II. Transmission lines. Voltage reflection coefficient. VSWR. Impedance transformation. Smith Chart and applications. Design of stub tuners.

III. Vector Analysis. Dot and cross product, divergence and curl operators, Gauss and Stoke's Theorems

IV. Maxwell Equations. Uniform plane electromagnetic waves in lossless media. Dispersion relationship. Poynting vector. Poynting theorems. Scattering of plane waves at one or more planar boundaries. Brewester angle phenomenon. Solution of EM plane-wave scattering at boundaries using an equivalent transmission-line circuit.

V. Guided electromagnetic waves and their interpretation in terms of uniform plane-wave constituents. Waveguides, including optical fibers. Resonators.

VI. Scattering parameters and applications to microwave measurements

VII. Microwave Applications