

## ECE-GY 5733 RF and Microwave Systems Engineering

Review of EM theory and transmission lines. Printed transmission lines. S, Z, Y, ABCD parameters, network theory, signal flow graphs, CAD methods. Excitation of waveguides. Single and multisection impedance transformer, power divider, directional coupler, hybrid circuits. Microwave resonator: series, parallel resonators, stubs and cavities. Filter theory and designs, coupled-line filters, Kuroda identities, Chebychev and maximally flat filters.

Prerequisite: ECE-UY 3604.

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### Weekly Outline:

Lecture 1 Phasor, Impedance matching and Two-port Network (pp. 8-9; 78-79; 173-178, 4<sup>th</sup> edition)

Lecture 2 Transmission line and Scattering Matrix (pp. 48-51; 56-63; 178-184, 4<sup>th</sup> edition)

Lecture 3 ABCD Matrix (pp. 188-194; 63-72, 4<sup>th</sup> edition)

Lecture 4 Microstrip and Impedance Matching & Tuning (pp. 147-150; 228-241, 4<sup>th</sup> edition)

Lecture 5 Double-stub tuning and Quarter Wavelength Transformer (pp. 72-75; 241-249, 4<sup>th</sup> edition)

Lecture 6 More Impedance Matching & Tuning (pp. 250-261, 4<sup>th</sup> edition)

### Midterm Exam

Lecture 7 Microwave Filter (pp. 399-415, 4<sup>th</sup> edition)

Lecture 8 Microwave Filters and RLC Resonators (pp. 272-278; 415-426, 4<sup>th</sup> edition)

Lecture 9 Power Dividers & Directional Couplers (pp. 317-333; 343-347, 4<sup>th</sup> edition)

Lecture 10 Noise and Nonlinear Distortion (pp. 496-521, 4<sup>th</sup> edition)

Lecture 11 Microwave Amplifier Design (pp. 558-570, 4<sup>th</sup> edition)

Lecture 12 More on Microwave Amplifier Design (pp. 571-601, 4<sup>th</sup> edition)

Lecture 13 Microwave Systems (pp. 658-708, 4<sup>th</sup> edition)

### Final Exam

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Textbook: David M. Pozar, "Microwave Engineering," 4<sup>th</sup> edition, John Wiley & Sons, Inc (other edition is fine too)

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Grading (Midterm 40%; Final 40%; Homework and Class Participation 20%)

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