ECEn 464 Exam 1 Topics

1. Transmission lines
   (a) General expressions for voltage and current on the line
   (b) Reflection coefficient
   (c) Input impedance
   (d) Smith chart
   (e) Quarter wavelength line

2. S-parameters
   (a) Definition
   (b) Reference planes
   (c) Lossless, reciprocal, symmetric networks
   (d) Examples - length of line, $2Z_0$ line, 3dB attenuator, series/shunt reactance/inductance

3. Matching
   (a) Lumped element $L$ section matching - formulas or Smith chart
   (b) Quarter-wave transformer
   (c) Multisection broadband matching - binomial design

4. Power dividers/couplers
   (a) Tee
   (b) Wilkinson divider, even/odd mode analysis
   (c) Quadrature hybrid (branch line coupler)

5. Amplifiers
   (a) Gain expressions
   (b) Conjugate match for maximum power transfer
   (c) Unilateral devices
       - Constant gain circles
       - Design procedure for specified gain
       - Source and load matching networks