ELCT 564 Projects

Projects are required for Graduate credit.

Undergraduate Students taking the class for undergraduate credits are not required to do any project. The project grade of 20% will be evenly distributed between the two exams for Undergraduate Students taking the class for undergraduate credits.

Project List to Pick From

1. Considering the general field equations for the TE and TM modes derive the expressions for attenuation due to conductor loss for a rectangular waveguide. Do not consider a specific mode.

   Also derive an expression for the maximum power handling capability for a rectangular waveguide considering the dominant TE10 mode of propagation.

   Then study the literature on ridged waveguides, define their design equations, advantages and disadvantages.

2. Study the literature to research microstrip transmission lines. Develop a numerical solution method using which microstrip transmission lines can be analyzed or designed. Consult the basic sources from which the quasi-static design equations originated from and then from their shed lights on characteristic impedance versus permittivity variation, attenuation variation as function of conductor thickness, dielectric dispersion etc.

3. Broadband impedance matching is an important area in RF circuit design. Considering series and parallel LC resonant circuits and series L and series C describe the methodology to accomplish such goals. Considering a simple unmatched impedance on the Smith chart show how you can match it for over a broad frequency range.

4. Study the literature and company datasheets to present an overview of lumped element passive components e.g. L's and C's. Define their losses, resonant frequencies, quality factors, temperature, voltage, power limitations, and solderability. Present a summary of inductors and capacitors that are used in MMIC's e.g. spiral inductors and MIM capacitors.

Deliverables: a report not more than 10 pages and a class presentation for about ½ an hour.