Instructor: Professor Yasuo Kuga, Rm430 EEB, OH: TBD
Tel: 543-0478, ykuga@u.washington.edu
Schedule: Lecture: TBD 6-9pm Lab: TBD
TA: TBD
Prerequisite: Basic EM course, EE361 or equivalent

This course will be based on my lectures notes and references
Textbooks: (recommended but not required)

**Topics (tentative):**
1. Transmission line
2. Transmission line matching techniques.
3. Microwave circuit analysis using S-parameters
4. Electrical properties of materials and measurement techniques
5. Dispersion and anisotropic media
6. TDR, time domain analysis and parameter extraction techniques
7. 90° and 180° hybrid analysis and design
8. Microwave filter analysis and design
9. Design of microwave amplifiers

**HW/Lab projects (tentative)**
- TDR time-domain analysis of complex loads
- TDR coupled noise on TLs
- Forward and inverse problem: Estimation of the dielectric constant
- Estimation of the dielectric constant using the reflection method
- Microwave hybrid design
- Microwave filter design
- Microwave amplifier design

**Lab instruments and simulation software: TBD in Fall 2021**
- Time-domain reflectometer (TDR)
- Microwave Network analyzer (NWA)
- Ansys ED (Electronics Desktop)

**Grading policy:** Five to six HW/projects will be assigned. The final grade will be based on the projects/reports. No exam.
TDR Lab (Forward and backward coupled noise on TL)

Examples of microwave circuits

Examples of microwave amplifier using Ansys ED
2020 Final Project: 2.4 GHz Balanced Amplifier Design

Figure 1: 2.4 GHz Balanced Amplifier EM Layout with Elements

Figure 2: 2.4 GHz Balanced Amplifier Circuit Simulation

Figure 3: 2.4 GHz 90 Deg Hybrid Circuit Design