# EE 483L/583L Antennas for Wireless Communications (Spring 2026)
# Laboratory 10- Yagi-Uda Antenna Matching

## Background

For this project, you or your team will impedance match the Yagi-Uda antenna, designed in previous labs, for a local UHF television (TV) station. It should have a gain ≥ 10 dBi, and VSWR < 1.1 at center frequency and VSWR < 1.7 across the frequency band of the selected UHF TV station when fed using a 50 Ω coaxial transmission line (supplied by instructor).

## Experiment (*By availability*. All partners must be present.)

1) **Before** making any matching adjustments to the antenna (i.e., set all lengths to design values), work with instructor to use a vector network analyzer (VNA) to collect data and/or graphs needed to plot VSWR, linear magnitude of the reflection coefficient (AKA $|s_{11}|$), and antenna input impedance $Z_{ant}$ (both Smith chart and rectangular format) for $f_c$ ± **10 MHz** ($f_c$ is the center frequency of your antenna).

   Note: The names of the data/graphics files should be recorded in the logbook as taken. The actual files should be available in/with logbook (e.g., USB flash drive).

2) Using the VNA, match the antenna with instructor assistance. Collect the data and/or graphs needed to plot the VSWR, $|s_{11}|$, and $Z_{ant}$ (both Smith chart & rectangular format) for $f_c$ ± **10 MHz**.

3) On four consecutive pages in logbook & report, generate (give/show applicable equations if necessary) and insert four pairs of plots with **each pair on same page** showing the: 1) VSWR, 2) $|s_{11}|$, 3) $Z_{ant}$ in Smith chart format, and 4) $Z_{ant}$ in rectangular format before (top) and after (bottom) matching for $f_c$ ± **10 MHz**. On the plots, indicate the lower $f_l$, center $f_c$, and high $f_h$ frequencies of the selected UHF TV channel.

4) Accurately draw the **actual** antenna after construction **and** matching, include all relevant dimensions (e.g., telescoping tips).

5) Make a **tabulated** summary of the initial theoretically-matched and boom-compensated design, i.e., where you left off after Lab #7/8, and final actual matched antenna. This should include all lengths, spacings, etcetera. Format: Col. 1 quantity, Col. 2 initial values, Col. 3 final values. Compare and contrast the actual antenna with the initial design.

6) Summarize/comment on results.

## Logbook & Report (You may work independently or in pairs if jointly building antenna.)

- Show complete rough work in logbook.
- Following syllabus guidelines, compose a short report on this lab.

**Antenna (labeled!), report & logbook due Tuesday, April 28, 2026 by 4 pm at my office ( EEP 314).**