Here is a recorded link from the Jan 8th EE529 Lecture on MMICs provided by Keysight Technologies Engineers Anurag Bhargava and Joe Schultz. First of all, Cal Poly and our EE529 students really appreciated the contribution these two Keysight engineers are making towards the 29 students in EE529. Very much appreciated and student career impactful! I have also downloaded the entire GByte video from ZOOM and will make it available shortly to all.

https://calpoly.zoom.us/rec/share/8A5Z35JI8Nc4KL_r1bsOewKrnCsyPfKMZWIRCGBFX96YlwV9Js30UeNE3hfj3kuR.qm9pOHUo0TiPxGQ1?startTime=1767913502000
Passcode: FtG6TeN=

Here is an outline of what was covered in this first three-hour session on Jan 8, 2026:

1. Anurag Bhargava first gave an introduction presentation on Microwave Monolithic Integrated Circuits (MMIC) and the process steps used in creating MMICs (attached power point presentation Cal Poly MMIC Session 1) Here is a general outline of the presentation:

a. Introduction to MMICs
b. MMIC design flows
c. Building blocks for MMICs
d. Keysight ADS simulation tool built-in MMIC process development kit that are included in the CAD program

2. Joe Shultz then did a Introductory Session on how to use the Keysight ADS design tool to create MMIC designs that will ultimately be submitted to an integrated circuit foundry. In our case, the target foundry will be the United Monolithic Semiconductor GH15 GaN process. A general outline of Joe Shultz's presentation content is as follows.

1. Loading the UMS GH-15 Process Development Kit into Keysight ADS
2. Loading the Internal Keysight Practice Process Development Kit into Keysight ADS
3. Reviewing the components that are available in each process development kit
4. Reviewing the layout artwork for each process development kit.
5. Doing a starting point Keysight ADS s-parameter measurement of a spiral inductor in the UMS GH-15 Process.
6. Examining the non-idealities of a spiral inductor compared to a perfect inductor in simulation - interwinding capacitance, substrate effects, current capability, and loss.
7. Using RF pro electromagnetic simulator to further analyze the circuit model of the spiral inductor.
8. Suggestions for next week's homework for EE529 Students.

HOMEWORK DUE BEFORE NEXT WEEK SESSION ON Jan 15th.

Here is the homework that all students should accomplish and upload to the EE529-02 laboratory notebook canvas site by Jan 15th at midnight.

1. **Spiral Inductor Analysis**

a. Load the UMS GH-15 Process Development Kit into your copy of Keysight ADS
b. Load a spiral inductor model into a schematic and do an s-parameter simulation of the spiral inductor. Include your schematic diagrams, simulation and support text in your report.
c. Come up with an equivalent circuit model of the spiral inductor using ideal capacitor, inductor and resistor models. Include your schematic diagrams, simulation and support text in your report.
d. Do an RF pro simulation of the spiral inductor and compare it to the step b inductor model simulation. Include your schematic diagrams, simulation and support text in your report.
e.

2. Resistor Analysis:

a. Load the UMS GH-15 Process Development Kit into your copy of Keysight ADS
b. Load a resistor model into a schematic and do an s-parameter simulation of the resistor. Include your schematic diagrams, simulation and support text in your report.
c. Come up with an equivalent circuit model of the spiral inductor using ideal capacitor, inductor and resistor models. Include your schematic diagrams, simulation and support text in your report.
d. Do an RF pro simulation of the resistor and compare it to the step b resistor model simulation. Include your schematic diagrams, simulation and support text in your report.

3. Capacitor Analysis:

a. Load the UMS GH-15 Process Development Kit into your copy of Keysight ADS
b. Load a capacitor model into a schematic and do an s-parameter simulation of the capacitor. Include your schematic diagrams, simulation and support text in your report.
c. Come up with an equivalent circuit model of the spiral capacitor using ideal capacitor, inductor and resistor models. Include your schematic diagrams, simulation and support text in your report.

d. Do an RF pro simulation of the capacitor and compare it to the step b capacitor model simulation. Include your schematic diagrams, simulation and support text in your report.

ORGANIZATION OF FUTURE SESSIONS

At the end of the presentations on Jan 8, Anurag Bharava and Joe Schultz talk and the EE529 faculty/students planned the organization of the 10 three-hour sessions (3-6PM on Thursdays) that would be provided for the EE529 class. (Tentative Agenda subject to change depending on Keysight Engineers availability)

Jan 8th: Session 1- General introduction to MMICs, Keysight ADS, and the United Monolithic Semiconductor GH-15 process development kit.
Jan 15th MMIC Power Amplifier Design Session 1
Jan 22nd MMIC Power Amplifier Design Session 2
Jan 29th MMIC Power Amplifier Design Session 3
Feb 5th MMIC Power Amplifier Design Session 4
Feb 12th MMIC Low Noise Amplifier Design Session 1 (depends on when the power amplifier design session is complete)
Feb 19th MMIC Low Noise Amplifier Design Session 2
Feb 26th MMIC Low Noise Amplifier Design Session 3
March 5th TBD -Will determine this as we see how we progress
March 12th TBD - Will determine this as we see how we progress

Each of these presentations will be done Thursdays 3-6PM over this ZOOM Link. https://calpoly.zoom.us/j/82909820920