Success Story

Oregon Tech Students Readily Learn RF/Wireless Design Using NI AWR Software

Company Profile

Founded in Klamath Falls in 1947, Oregon Institute of Technology is the premier public polytechnic institute in the Pacific Northwest, with enrollment of more than 5,200 students. Oregon Tech provides bachelor and master-level degree programs in engineering, technology, health care, management, communication, and applied sciences. Through these programs, students are prepared to be effective, highly skilled professionals with hands-on, experiential learning and real world experiences in labs, in the field, and through internships, externships and capstone projects.

Application:
RF/Microwave Curriculum
Software:
NI AWR Design Environment
Microwave Office
AXIEM

The Design Challenge

The challenge for Assistant Professor Aaron Scher is to develop a breadth of computer-aided design assignments to support technical learning objectives for Oregon Tech's RF and wireless engineering and electromagnetics (EM) classes. The activities must be engaging and provide students with industry-relevant skills and experiences.

The Solution

NI AWR Design Environment software provides students with a platform for actively exploring concepts related to RF/microwave circuit design and modeling. The tight integration of Microwave Office circuit simulation with AXIEM 3D planar electromagnetic (EM) analysis gives undergraduate engineering students an opportunity to explore not only design but also optimization and EM modeling of electrical components like filters, baluns, and antennas.

One such design example is seen in Figure 1. It is a filter design fabricated using an RT/Duroid substrate and the university's LPKF prototyping platform.

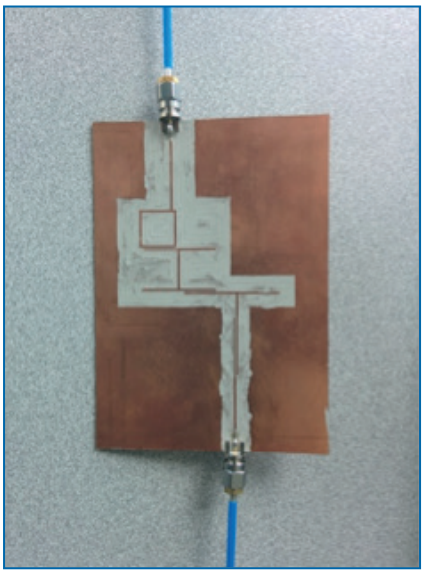

Figure 1: A student's filter design realized with NI AWR software.

"NI AWR Design Environment software is multi-faceted and therefore can be used in each and every step of the design process, from conception to iteration to layout. My favorite part about the software is the tight integration of the AXIEM planar EM solver with circuit schematics. Once students learn the flow of the software, they can do things like optimize passive structures with relative ease."

– Aaron Scher
Assistant Professor and Program Director BSEE and BSEET Programs
Oregon Institute of Technology
oit.edu

The filter was designed and optimized (Figure 2) within NI AWR Design Environment. The basic purpose of the filter is to demonstrate that any geometric shape can be used to design a narrow-band coupled resonator bandpass filter. In this case, the filter contains three edge-coupled microstrip resonators that spell out the initials "OIT" for Oregon Institute of Technology.

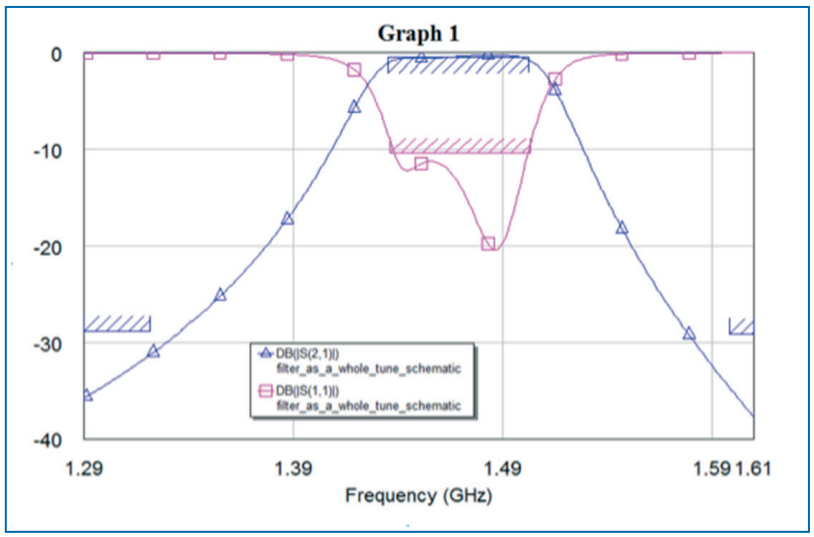

Figure 2: Simulated frequency response of the filter.

Like any advanced software suite, NI AWR software can seem a bit overwhelming at first. Instead of blindly throwing students into the deep end of the learning pool, Professor Scher developed tutorial videos and lectures to gently guide students up the learning curve of NI AWR software through step-by-step processes from simple DC analysis to antenna design and analysis.

Student feedback has been positive and they report a strong motivation for learning how to use industry-relevant software. Tutorial videos (EM optimization using NI AWR software) have also been posted to: http://bit.ly/2qpIYA7.

Why NI AWR Design Environment

Oregon Tech is able to provide a thorough education and augment it with practical use of EDA software thanks to the ni.com/awr University Program, which supports qualified teaching universities with a full range of software donations as well as direct student access to their own 180-day license file, making it convenient to learn and study outside the classroom. Professor Scher comments that the software is multi-faceted and therefore can be used in each and every step of the design process, from conception to iteration to layout. His favorite part about the software is the tight integration of the AXIEM planar EM solver with circuit schematics. Once students learn the flow of the software, they can do things like optimize passive structures with relative ease.