A PROJECT-BASED GRADUATE ANTENNA COURSE

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A project-based graduate course on Microwave Planar Antennas was developed and taught at Syracuse University twice. A basic antenna course was prerequisite for the course. During the first half of the semester, the theory of the microstrip antennas was studied. Then students were divided into small groups of two or three and each group was required to design, simulate, build and test a microstrip antenna or an array of them. These are typical steps that an antenna engineer follows in industry. Some groups received design specs from local industry while others chose their problems from the literature. The initial design was based on the theory provided in the first half of the course. The simulations were carried out using different commercial software available in our lab. The optimized designs were then built and tested in our microwave lab or in the facilities of local microwave industry. Each group prepared a final report for their projects and presented their results to an audience of experienced antenna engineers from the local industry. One of the projects was an X-Band Quasi Yagi Antenna. The center frequency was 10GHz with 40% bandwidth and 50 Ohm input impedance. An end-fire beam with linear polarization was required. The antenna was built on a 25 mil thick substrate with relative dielectric constant of 10.2 and loss tangent of 0.0023. The antenna was printed on the substrate using a milling machine we have in our microwave lab. The size of the finished product was less than 15mm by 15mm. The simulated and measured results for the VSWR were in excellent agreement. The measured and simulated antenna gain patterns showed satisfactory agreement. Results for this and other projects will be presented during the meeting. This practical, project-based graduate course was very well received by the industry and the students.