



## Engineering Fundamentals Participates in Pre-Calculus Courses

Of the 620 entering freshman engineering students in Fall, 2102, 21% placed in Pre-Calculus, delaying their start in the Engineering Fundamentals courses until the spring semester. Typically, only about 65% of these students enroll in Engineering Fundamentals in the spring semester, with the rest leaving engineering. As part of our NSF RISER grant, four



special sections of Pre-Calculus were created for these students. Dr. Richard Bennett and Dr. Claudia Rawn visited these sections about every other week during the semester. They would give announcements related to the college, and spend about 10 minutes presenting an engineering application of the current math topic. Applications included design of a reinforced concrete beam (quadratic equation), how a bathroom scale works (lines), time to drain a tank (functions), measuring speed with the Doppler effect (rational functions), determining altitude from atmospheric pressure (logarithmic functions), sound tones and Fourier transforms (sine functions), and the direction an airplane needs to fly (law of sines and cosines). A full description of each application is at <http://ef.engr.utk.edu/RISER/pre-calculus/math-130/>. There was a 15% increase in retention in engineering for these sections. The full results will be presented in a poster at the American Society of Engineering Education's Annual Conference this summer.



## EF 152 Final Project: Multiple Options



We implemented a new aspect to the EF 152 final project, allowing students to choose between several different projects rather than a common project. The idea was to allow students to work on a project that was close to their chosen engineering discipline. The theme was providing engineering help to a remote village. Students chose between a water diversion device, a water filtration system, a carrot collector, a bridge, and a light generator.

Details of the project are at <http://ef.engr.utk.edu/ef152-2012-08/tm/os/index.php> with a gallery of the projects at <http://ef.engr.utk.edu/ef152-2012-08/tm/os/project-gallery.php>. Having multiple projects was quite successful. Students enjoyed seeing other projects, and working on something that was of interest to them.

