

1023-F5-1094 **Phil Gustafson*** (pgustafs@mesastate.edu), Mesa State College, Department of Mathematics,
1100 North Ave, Grand Junction, CO 81501-3122. *Fourier Analysis in a Calculus Course Using
Student-Generated Sound Waves*. Preliminary report.

Advancements in communication theory are critical to modern society, and the subject is rich with applications of Fourier analysis. But do our math students know what Fourier analysis is? To help address this question, we describe how Fourier frequency analysis can be used to enhance a calculus course. We begin with a brief discussion comparing Fourier series with Taylor series. Then, with the help of free software, we show how frequency analysis can be performed on student recorded audio files, such as voice waves and telephone dial tones. In the case of voice recordings, students graph and listen to their voice wave, determine dominant frequencies, and compare frequency spectrums. With dial tone recordings, students exchange phone number audio files, and then determine what their partner's phone numbers are using frequency analysis and industry-established dial tone frequencies. These classroom activities expose students to Fourier analysis, provide a current application of calculus, and motivate further study of mathematics. (Received September 25, 2006)