“Why care about air pollution control?” The short answer is that air pollution causes significant adverse health effects, including early death(!) and excess disease, and impacts the environment (reduced visibility, climate change, ozone depletion, acid rain). We will investigate the major air pollutants of concern including particulate matter, volatile organic compounds, sulfur oxides, and nitrogen oxides. We will discuss background topics such as health effects, aesthetic effects (acid rain, visibility), laws and regulations, meteorology, atmospheric chemistry and pollutant transport in the atmosphere.

“What is air pollution control all about?” A very important way to reduce air pollution is to use air pollution controls to keep the pollutant emissions to a minimum. We will learn to design controls to remove particles from air streams such as cyclones, electrostatic precipitators, baghouse filters and scrubbers. We remove gases from air streams using controls such as incinerators, adsorption systems, and tower absorbers. We will learn to control sulfur and nitrogen oxides, and we will learn about mobile source emissions and controls. Two design projects, each lasting ~5 weeks, are a major component of the course and we will use these design projects to get practical experience in design.

By the end of this course you will understand natural and anthropogenic sources of air pollution and know how to prevent or minimize air pollution by designing and applying various control technologies. You will be able to determine whether an air pollution problem exists, identify which emission sources should be controlled, estimate how much control is needed, and design the appropriate control technology. You will also be more informed about major topics of current concern, namely climate change, carbon sequestration, and indoor air quality.