This thesis reports on the results of a mobile source emissions inventory for the University of Central Florida (UCF). For a large urban university, the majority of Volatile Organic Compounds (VOC), Oxides of Nitrogen (NOx), and carbon dioxide (CO2) emissions come from on-road sources: personal vehicles and campus shuttles carrying students, faculty, staff, and administrators to and from the university, as well as university business trips. In addition to emissions from daily commutes, non-road equipment such as lawnmowers, leaf blowers, small maintenance vehicles, and other such equipment utilized on campus contributes to a significant portion to the total emissions from the university. UCF has recently become the second largest university in the nation (with over 56,000 students enrolled in the fall 2010 semester), and contributes significantly to VOC, NOx, and CO2 emissions in Central Florida area. In this project, students, faculty, staff, and administrators were first surveyed to determine their commuting distances and frequencies. Information was also gathered on vehicle type, and age distribution of the personal vehicles of students, faculty, administration, and staff as well as their bus, car-pool, and alternate transportation usage. The EPA approved mobile source emissions model, Motor Vehicle Emissions Simulator (MOVES2010a), was used to calculate the emissions from on-road vehicles, and UCF fleet gasoline consumption records were used to calculate the emissions from non-road equipment and on campus UCF fleet vehicles. The results of the UCF mobile source emissions inventory are reported and compared to a recently completed emissions inventory for the entire three-county area in Central Florida.