

An aerial photograph of a large, multi-story university building with a central tower and a brown tiled roof. In front of the building is a large green lawn with a circular garden bed in the center. The lawn is surrounded by palm trees and other tropical vegetation. Several cars are parked on the roads around the lawn. The background shows a hazy cityscape and distant hills.

# BASIC ELECTRONIC CIRCUITS

**Tutorial 12<sup>th</sup> April 2019**

- Design a band pass active filter having  $f_L = 400 \text{ Hz}$ ,  $f_H = 2 \text{ KHz}$  and pass band gain of 4. Assume the resistor values as  $1 \text{ K}\Omega$ , and calculate the feed back resistor value. Also determine  $V_o$  in terms of  $V_i$  at  $f = 100 \text{ Hz}$ ,  $400 \text{ Hz}$ ,  $894 \text{ Hz}$ ,  $2 \text{ KHz}$ , and  $10 \text{ KHz}$ .

- An op-amp based multivibrator (Astable) circuit is constructed using the following components,  $R_1 = 35\text{ K}\Omega$ ,  $R_2 = 30\text{ K}\Omega$ ,  $R = 50\text{ K}\Omega$ , and  $C = 0.01\text{ }\mu\text{F}$ . Calculate the circuit's frequency of operation.

- A wien bridge oscillator is having  $R_f = 6.4 \text{ K}\Omega$ ,  $R_i = 3.2 \text{ K}\Omega$ , series combination ( $R_1 = 5 \text{ K}\Omega$ ,  $C_1 = 7.5\text{nF}$ ), and parallel combination ( $R_2 = 13\text{K}\Omega$  and  $C_2 = 4.65\text{nF}$ ). Determine the transfer function of the feed back network ( $V_f/V_o$ ), also determine the frequency of oscillations.

- Design a 4 bit R-2R ladder ADC, and determine  $V_o$  for following input bit sequences, i) 1000, and ii) 0001.