**ECE/EEE F311 Communication Systems (First Semester 2023-2024)**
**Lab-3 (Saturday) (02-09-2023)**

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# Objectives

In this task, the objective is to study telephone tones and amplitude modulated signals.

# Task 1

You listen various tones (dial, ringing, busy) using a telephone. These tones are generated with a combination of sine wave of various frequency. The tone plan is based on ITU-T Standard recommendation. The dial tone is a continuous tone of the addition of the frequencies 350 and 440 Hz. The ringing tone comprises frequencies of 440 and 480 Hz and a cadence of 2 seconds ON and 4 seconds OFF. The busy tone has frequency components of 480 and 620 Hz and a cadence of one half second ON and one half second OFF. Use this tone plan to generate **DIAL /RINGING/BUSY** tone. Use a speaker to listen **DIAL /RINGING/BUSY** TONE by applying command playsound. While generating the sinewave, mind its amplitude (take 0.1 volt). Use appropriate sampling frequency.

**Write the full code in a single .m file using if conditions to separate codes for busy, dial, and ringing tones.**

# Task 2

(a) Amplitude modulate a carrier signal $c(t) = \cos 2000\pi t$ using a message signal $m(t) = \sin 400\pi t$, as $x(t) = c(t)m(t)$. Plot the time-domain and frequency-domain of output signal $x(t)$.

(b) Apply synchronous detector on $x(t)$ to recover back $m(t)$ .

(c) Do (a) and (b) if $m(t) = 400sinc(400\pi t)$.
**Use a single .m file using if conditions.**