NED University of Engineering & Technology – Department of Computer & Information Systems Engineering
*Seat No.:* **CS-24037**   *Full Name:* **Abdur Rahman**   *Group:* **G1**

Lab Session No. 03

1. Write a MATLAB script to carry out the following tasks:
a) Plot two continuous time sinusoids $x1(t) = \cos 2\pi t$ and $x2(t) = \cos 14\pi t$ for $0 < t < 5$ seconds, and choose a suitable time step.
b) Sample them using a sampling rate of 3 samples/s.
c) Plot the resulting discrete time sinusoids.
d) Reconstruct the signals
e) You must divide the figure into six subplots so that reconstructed signal and DT version of x1(t) lie in the same column and so are those of x2(t).
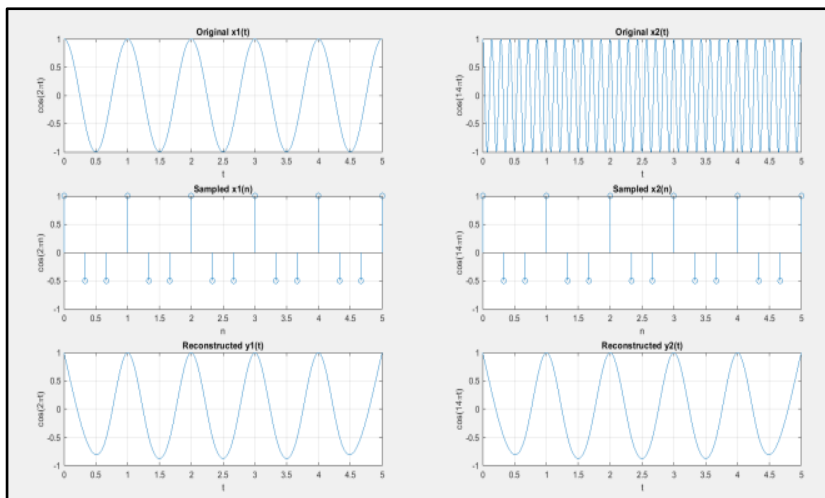
2. Does aliasing occur in sampling process in question1? Briefly explain why?

3. Consider an analog signal $x(t) = \sin(20\pi t)$, $0 < t < 1$, choose a suitable time step. Draw three signals $x1(n)$, $x2(n)$, and $x3(n)$ each sampled at sampling intervals of 0.01, 0.05, and 0.1 seconds respectively. Take a subplot of 3x3 such that:
a. Original $x(t)$ is plotted in top row, first three positions.
b. Sampled signals $x1(n)$, $x2(n)$, and $x3(n)$ are plotted in middle row.
c. Using the cubic spline interpolation, reconstruct the analog signal $y1(t)$, $y2(t)$, and $y3(t)$ from the sampled signals $x1(n)$, $x2(n)$, and $x3(n)$ and place them in third row.
d. Compare the individual reconstructed waves in bottom row with the original waves in top row and comment on your results whether aliasing occurs or not and why?