**Electrical and Computer Systems Engineering Department**

**Simulation Lab

(ENEE4104)***Assignment 1
 DSB-Standard AM Modulation & Demodulation*

 bIRZEIT UNIVERSITY

Name: Ali Sider

Student Number: 1111829

Dr.: Jamal Seyam

Eng.: Al-Mutasem Bellah Omar

Section: 2

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Part One: **AM Modulation**

For m(t) = 10 cos ($400πt$) and c(t) = 20 cos ($70000πt$)

Modulation Index = 0.5

MatLab Code:

Fm = 200;

Fc = 35000;

M = 0.5; %modulation index

fs=70000;%sampling frequency

n=0:7:7000;

m=10\*cos(2\*pi\*Fm\*n/fs); %Modulating Signal

c=20\*cos(2\*pi\*Fc\*n/fs);%Carrier Sinal

s =(1+M\*cos(2\*pi\*200\*n/fs)).\*c ;%Am Signal

stem(s);grid;

title('Modulated Signal');

ylabel('Amplitude');

xlabel('n')


*Figure -1-: Message Signal.* *Figure -2-: Message Signal Spectrum.*


*Figure -3-: Carrier Signal.*

 *Figure -4-: Carrier Signal Spectrum.* *Figure -5-: Sampled Modulated Signal.*

 *Figure -6-: Modulated Signal in Time Domain.*


*Figure -7-: Modulated Signal in Frequency Domain.*

Part Two: **AM Demodulation (Receiver)
Using Envelop Detector Method**

env =abs(s) - 20; %to obtain the envelop of the modulated signal, -20 is to remove the DC component of the signal.

**Using SPTool to Design a Low Pass Filter**



*Figure -8-: Magnitude Response and Filter Parameters.*

 **After Filtration**



 *Figure -9-: Demodulated Signal.*

**The Amplitude of Demodulated Signal =10.4 volt.
The Frequency of Demodulated Signal =200 Hz.**



*Figure -10-: Curser Measurement.*