

Delivery Plan (Weekly Syllabus)
 المنهاج الاسبوعي النظري لمادة : اشارة وانظمة

	Material Covered
Week	Syllabus
1	BACKGROUND : Complex Numbers, Sinusoids, Sketching Signals
2	Introduction, The Elements of Signals and Systems , Signals classification overview
3	The Mathematical Approach to Signals and Systems, Signal Representation, Time Domain and Frequency Domain Representation of Signals, Representation of Signals in the Complex Frequency Domain
4	Some Useful Signal Models, The Unit Step Function $u(t)$, The Unit Impulse Function $\delta(t)$, The Exponential Function e^{st}
5	Basic Operations on signals, Time Shifting, Time Scaling, Time Reversal, Combined Operations
6	Properties of Signals, Size of a Signal, Signal Energy and Power, Transformations of Signals, Periodic, Even and Odd Functions, Some Properties of Even and Odd Functions, Even and Odd Components of a Signal Even and Odd Signals
7+8	Classification of Signals , Continuous-Time and Discrete-Time Signals, Continuous-Amplitude and Discrete-Amplitude Signals , Exponential and Sinusoidal Signals, Continuous-Time Complex Exponential Signals, Discrete-Time Complex Exponential Signals, Continuous-Time and Discrete-Time Signals, Analog and Digital Signals, Periodic and Aperiodic Signals, Energy and Power Signals, Deterministic and Random Signals
9+10	Midterm + Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.
11	Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Properties of Fourier transforms.
12	Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.
13+14	Introduction to Systems, Classification of Systems, Linear Time Invariant (LTI) systems, system, impulse response, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics.
15	Concept of convolution in time domain, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between convolution and correlation.
Week 16	Final Exam