

Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

## Course Description: **Signal Processing**

### 1- Basic Information:

Course Name	<b>Signal Processing</b>
Course ID	<b>SIP</b>
Contact Hours (Registered Sessions)	<b>14</b>
Contact Hours (Synchronized Sessions)	<b>14</b>
Mid Term Exam	-
Exam	<b>75 min</b>
Registered Sessions Work Load	<b>14</b>
Synchronized Session Work Load	<b>14</b>
Credit Hours	<b>3</b>

### 2- Pre-Requisites:

Course	ID
Discrete Structures	DSR
Mathematical Analysis II	MA2
Linear Algebra	LA
Computer Programming II	CP2

### 3- Course General Objectives:

- The main objective of this course is to introduce the basic concepts and principles of signal processing and systems analysis. It focuses on digital signals, types, its acquisition methods, digitization and discrete systems due the important role played by the computer in engineering applications and in our daily life. In this course we focus on the types and characteristics of signals and systems in the digital signal processing system, its relation to time and frequency, its modeling mechanism, and its mathematical representation using discrete differential equations, then, we introduce the basic signal processing operations, sampling theorem and its applications, Fourier series, Fourier transform and its application, Laplace and Z transform, Transformation function , digital filters and its realization methods. At the end of the course, a number of digital signal processing applications will be presented as speech and sound

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processing, image and communication processing as well as some other practical applications of signal processing using MATLAB.

### 5- Intended Learning Outcomes (ILO):

Code	Intended Learning Outcomes
ILO1	Signals and its representations
ILO2	Signal Sampling and Quantization
ILO3	Linear invariant Time Systems
ILO4	Fourier Series
ILO5	Fourier Transform
ILO6	Fourier transform applications
ILO7	Laplace transform
ILO8	Z transform
ILO9	Digital Filters
IL10	Some Signal Processing Applications

### 6- Course Syllabus (14 hours of total synchronized sessions; 14 hours of total Recorded Sessions)

- RS: Recorded Sessions; SS: Synchronized Sessions;

ILO	Course Syllabus	RS	SS	Type	Additional Notes
ILO1	Signals and its representations	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
ILO2	Signal Sampling and Quantization	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
ILO3	Linear invariant Time Systems	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects	Practical Exercises

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				<input type="checkbox"/> Practices <input type="checkbox"/> Others	
<b>ILO4</b>	<b>Fourier Series</b>	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
<b>ILO5</b>	<b>Fourier Transform</b>	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
<b>ILO6</b>	<b>Fourier transform applications</b>	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
<b>ILO7</b>	<b>Laplace transform</b>	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
<b>ILO8</b>	<b>Z transform</b>	1		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
<b>ILO9</b>	<b>Digital Filters</b>	2		<input checked="" type="checkbox"/> Exercises <input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	Practical Exercises
<b>IL10</b>	<b>Some Signal</b>	4		<input checked="" type="checkbox"/> Exercises	Practical Exercises

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	<b>Processing Applications</b>			<input type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	
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### 7- Assessment Criteria (Related to ILOs)

ISC	Interactive Synchronized Collaboration	Ex	Exams	Rpt	Reports
PF2F	Presentations and Face-to-Face Assessments	PW	Practice Work		

ILO Code	ILO	Intended Results	Assessment Type				
			ISC	PW	Ex	PF2F	Rpt
ILO1	<b>Signals and its representations</b>	Explain the main methods for signal representation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
ILO2	<b>Signal Sampling and Quantization</b>	describe the sampling theorem and its applications	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
ILO3	<b>Linear invariant Time Systems</b>	List the characteristics of the linear system and invariant time signals	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
ILO4	<b>Fourier Series</b>	describe the three types of fourier series representation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
ILO5	<b>Fourier Transform</b>	Explain Discrete Fourier transform (direct + Inverse)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
ILO6	<b>Fourier transform applications</b>	Recognize some applications of the DFT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
ILO7	<b>Laplace transform</b>	define the laplace transform	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
ILO8	<b>Z transform</b>	Define the Z transform and its	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>

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ILO9	Digital Filters	Recognize the types of digital filters and list its types	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
IL10	Some Signal Processing Applications	Explain some signal processing applications	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>

### 7-Practice Tools:

Tool Name	Description
<b>MATLAB</b>	Signal Processing Toolbox

### 8-Main References

Li Tan, “Digital Signal Processing Fundamentals and Applications”, Elsevier, 2008, ISBN: 978-0-12-374090-8
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### 9-Additional References

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