

**SIGNAL PROCESSING
2016-2017**

Bachelor Degree:	INDUSTRIAL ELECTRONICS AND AUTOMATION ENGINEERING	805G
Course title:	Signal Processing	654
Year/Semester:	First Semester	ECTS Credits: 4,5

DEPARTMENT

ELECTRICAL ENGINEERING

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A) DIGITAL SIGNAL PROCESSING

Unit1.- Introduction.

- 1.1. Digital Processing Concept
- 1.2. Typical Applications of Digital Processing

B) ANALYSIS OF DISCRETE TIME SIGNALS

Unit 2.- Discrete-Time Signals and Systems.

- 2.1. Discrete-Time Signals.
- 2.2. Discrete-Time Systems.
- 2.3. Analysis of Discrete-Time Linear Time-Invariant Systems (LTI).
- 2.4. Discrete-Time Systems Described by Difference Equations.

Unit 3.- The z-Transform and its application to the analysis of LTI Systems

- 3.1. The z-Transform
- 3.2. Properties of the z-Transform
- 3.3. Rational z-Transforms

Unit 4.- Sampling and Signal reconstruction

- 4.1. Sampling and aliasing.
- 4.2. Analog to Digital and Digital to Analog Conversion

C) FREQUENCY ANALYSIS OF SIGNALS

Unit 5.- Frequency Analysis of Signals and Systems.

- 5.1. Frequency Analysis of Continuous-Time Signals
- 5.2. Frequency Analysis of Discrete-Time Signals.
- 5.3. Frequency-Domain Characteristics of Linear Time Invariant System (LTI).
- 5.4. Frequency Response of LTI

Unit 6.- The Discrete Fourier Transform (DFT).

- 6.1. Frequency Domain Sampling.
- 6.2. Properties of the DFT
- 6.3. Efficient Computation of the DFT (FFT).

D) DIGITAL FILTERS

Unit 7.- Digital Filters

- 7.1. LTI Systems as frequency filters
- 7.2. Finite Impulse Response Filter (FIR).
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Unit 8.- Design of digital filters

- 8.1. Design of FIR Filters.
- 8.2. Design of IIR Filters.

Unit 9.- Applications of Digital Filter.

- 9.1. Software Digital Filters.
- 9.2. Hardware Digital Filters.

E) PRACTICAL SESSION

Applications of Digital Processing in Digital Filtering

REFERENCES

Title
"Digital Signal processing", John Proakis, ISBN: 0-13-394338-9, Publisher: Prentice Hall, 1996, Third edition
"Digital Signal processing using matlab", Vinay K Ingle., 4th edition, ISBN 10:1305635124, ISBN 13:9781305635128 Publisher: CL Engineering, 2016
"Digital Filter Design handbook", Britton Rorabaugh, ISBN 10:,0079111661, ISBN 13:978-0079111661, Publisher: McGraw-Hill, 1996

EVALUATION SYSTEM

Project worth 20% of the overall grade
Reporting practices worth 20% of the overall grade
Examination worth 60% of the overall grade