Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF345	Digital Signal Processing	6	3	0	0	3	4

Prerequisites	INF316
Admission Requirements	INF316

Language of Instruction	French
Course Type	Elective
Course Level	Bachelor Degree
Objective	The objective of this course is to give basic information of signal processing. The aim is to present theoretical results on this subject and practical applications.
Content	w1 Digital processing, motivation and needs. The digital signal processing systems, characteristics and advantages w2 Signals and Systems I: discrete time and continuous-time signals. Transformation of the argument. Exponential and sinusoidal signals. The unit impulse and unit step functions. w3 Signals and Systems II: continuous time and properties of discrete-time system. Memory Systems, causality, stability, linearity and time invariance w4 The linear time invariant (LTI) systems: convolution sum and integral. Unit impulse response and convolution sum expression LTI systems. LTI system properties. w5 Term (periodic) signals to the expression in Fourier series. discrete time and continuous-time convergence of Fourier series and the properties of expressions w6 sign with non-periodic expression of Fourier series. discrete time and continuous-time convergence of Fourier series with properties and expressions w7 Fourier transform amplitude-phase expression. filter design, ideal and non-ideal at the time and frequency characteristics of filters w8 The mid-term w9 Sampling: The sampling of analog signals. sampling theorem, the sampling pulse train w10 The Laplace transform: convergence zone, transformation properties. systems using the Laplace transform analysis LTI w11 convergence zone: Z-transform. transformation properties. LTI systems using the Z transform analysis w12 Digital signal processing, software and applications, programming languages, development environments and the introduction of software w13 practical applications of the concepts I: Examples of digital signal processing and its applications w14 practical concepts applications II: Examples of digital signal processing and its applications
References	Francis Cottet, “TRAITEMENT DES SIGNAUX ET ACQUISITION DE DONNÉES” Dunod. Paris 2009 Vinay K. Ingle and John G. Proakis, “Digital Signal Processing Using MATLAB”, Cengage Learning, 2007

Theory Topics

Week	Weekly Contents
1	Digital processing, motivation and needs. The digital signal processing systems, characteristics and advantages
2	Signals and Systems I: discrete time and continuous-time signals. Transformation of the argument. Exponential and sinusoidal signals. The unit impulse and unit step functions.
3	Signals and Systems II: continuous time and properties of discrete-time system. Memory Systems, causality, stability, linearity and time invariance
4	The linear time invariant (LTI) systems: convolution sum and integral. Unit impulse response and convolution sum expression LTI systems. LTI system properties.
5	Term (periodic) signals to the expression in Fourier series. discrete time and continuous-time convergence of Fourier series and the properties of expressions
6	sign with non-periodic expression of Fourier series. discrete time and continuous-time convergence of Fourier series with properties and expressions
7	Fourier transform amplitude-phase expression. filter design, ideal and non-ideal at the time and frequency characteristics of filters
8	The mid-term
9	Sampling: The sampling of analog signals. sampling theorem, the sampling pulse train
10	The Laplace transform: convergence zone, transformation properties. systems using the Laplace transform analysis LTI
11	convergence zone: Z-transform. transformation properties. LTI systems using the Z transform analysis
12	Digital signal processing, software and applications, programming languages, development environments and the introduction of software
13	practical applications of the concepts I: Examples of digital signal processing and its applications
14	practical concepts applications II: Examples of digital signal processing and its applications