COURSE	Name	: Multidimensional Signal Processing
	Code	: EE185242
	Credit(s)	: 3
	Semester	: II

Description of Course

Multidimensional Signal Processing Course discusses about discriminant theories and algorithms, discrete systems and discrete transformations and the concept of LTI discrete time systems, multidimensional system applications in the field of images and video. In particular, the topics covered are the implementation of multidimensional discrete signals and systems, multidimensional discrete Fourier (DFT, FFT) analysis, cosmic discrete transformation (DCT), 2D Finite Impulse Response filter (FIR), 2D Infinite Impulse Response (IIR) filter, 2D bank filter, as well as discrete wavelet theory and transformation.

Learning Outcomes

Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

(S12) Working together to be able to make the most of his/her potential.

Course Learning Outcomes

Knowledge

Mastering the concept of multidimensional discrete signals and systems, and discrete transformations in the realm of complex, frequency and frequency domains, as well as the design of wavelets and multidimensional digital filters IIR and FIR.

Specific Skill

Able to analyze discrete, multidimensional discrete signals, systems and transformations in the realm of complex, frequency and frequency domains and the design of wavelets and digital filters IIR and FIR.

General Skill

Able to use Matlab/Simulink software for visualization and experimentation of multidimensional discrete signal and system, and discrete concepts, wavelet, and digital filter designs of IIR and FIR.

Attitude

Demonstrating attitude of responsibility on work in his/her field of expertise independently.

Working together to be able to make the most of his/her potential.

Main Subjects

1. Signal Concept and discrete multidimensional system.
2. 2D LTI Discrete time system.
3. Frequency Analysis of Signal and 2D LTI discrete time System.
4. Sampling and Reconstruction.
5. Transformation-Z.
6. 2D-DFT, 2D-FFT and 2D-DCT.
7. Digital FIR and IIR Filter Design
8. Introduction of Wavelet and Haar Wavelets

Reference(s)

[1] John W. Woods, “Multidimensional Signal, Image, and Video
[2] Processing and Coding,” 2nd ed., Academic Press, 2012.
[3] Saeed V. Vaseghi, Multimedia Signal Processing, Joh Wiley & sons Ltd., England, 2007.
[4] Jae S Lim, Two Dimensional Signal and Image Processing, 7th
[5] Prentice-Hall, NewJersey, 1990.
[6] Viney K Ingle and John G Proakis, Digital Signal Processing using Matlab, 3rd Ed., CENGAGE Learning, USA, 2012.

Prerequisite(s)

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