Course	Name	: Multimedia Signal Processing
	Code	: EE184937
	Credits	: 3
	Semester	: Elective

Description of Course

Telecommunication and internet networks carry traffic, most of which are multimedia content, with rapid growth from year to year. In this course students will study the characteristics, generation and processing of various types of multimedia signals, including: image, video, sound, and combination. In addition, the principles of compression will be studied from aspects of information theory and signal theory, as well as modern coding techniques. Various modern coding and compression methods used in various applications are also discussed, including: JPEG, JPEG2000, MPEG-1/2/4, mp3.

Learning Outcomes

Knowledge

(P02) Mastering the concepts and principles of engineering, and implementing them in the form of procedures for analysis and design in power systems, control systems, multimedia telecommunications, or electronics.

Specific Skill

(KK01) Able to formulate engineering problems in power systems, control systems, multimedia telecommunications, or electronics.

General Skill

(KU12) Able to implement information and communication technology (ICT) in the context of implementation of his/her work.

Attitude

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

Course Learning Outcomes

Knowledge

Mastering the concepts and principles of image, video and sound representation and coding that are efficient in the use of resources (memory and bitrate) for communication and distribution of multimedia signals on the network

Specific Skill

Able to analyze the characteristics of image, video and sound in terms of bandwidth, resolution, distribution of greylevel etc. as well as able to design compression and encoding multimedia signals according to bandwidth, quality and complexity requirements.

General Skill

Able to use software and multimedia coding tools, for example: Matlab and VcDemo etc. to analyze and encode multimedia signals.

Attitude

Show an attitude of responsibility for work in his area of expertise independently.

Main Subjects

1. Introduction to examples and applications for multimedia processing and shipping
2. Representation of various types of digital imagery
3. Light, color and human vision system
4. Basics of analog and digital video signals
5. Compression without losses and the basics of information theory
6. Compression with losses, quantization, transformation coding: DCT
7. Image compression
8. The basic principle of video compression
9. Standard video compression
10. Audio basics, speech
11. Digital audio compression

Reference(s)

[1] Ze-Nian Li, Mark S. Drew, & Jiangchuan Liu, "Fundamentals of Multimedia," 2nd ed., Springer, 2014
[2] Parag Havaldar & Gérard Medioni, "Multimedia Systems: Algorithms, Standards, & Industry Practices," Cengage Learning, 2010.
[3] Srdjan Stankovic, Irena Orovic, & Ervin Sejdic, "Multimedia Signals and Systems: Basic and Advanced Algorithms for Signal Processing," 2nd ed., Springer, 2016.

Prerequisite(s)

EE184403 Digital Signal Processing