



INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS
DEPARTEMEN TEKNIK ELEKTRO
Program Studi Magister (S2) Teknik Elektro

1	Nama Mata Kuliah / <i>Course Name</i>	: Pengolahan Sinyal Multimedia / <i>Multimedia Signal Processing</i>
2	Course Code	: EE255252
3	Kredit / Credits	: 3 SKS
4	Semester / Semester	: 2

Deskripsi Mata Kuliah / Course Description

Matakuliah ini mempelajari konsep pemrosesan sinyal untuk aplikasi multimedia, sinyal kontinu, sinyal digital, Transformasi fourier, FFT, transformasi kosinus diskrit dan kompresi multimedia.

This course studies the concept of signal processing for multimedia applications, continuous signals, digital signals, Fourier transforms, FFT, discrete cosine transforms and multimedia compression.

Capaian Pembelajaran Lulusan (CPL) Yang Dibebankan Mata Kuliah / Program Learning Outcomes Charged to The Course

1. (CPL-02) Mampu menguasai konsep dan prinsip keilmuan secara komprehensif, dan untuk mengembangkan prosedur dan strategi yang diperlukan untuk analisis dan perancangan sistem terkait bidang keahlian Teknik Sistem Tenaga, Teknik Sistem Pengaturan, Telekomunikasi Multimedia, Teknik Elektronika, Jaringan Cerdas Multimedia, atau Telematika sebagai bekal untuk pendidikan lanjut atau karir profesional.

(PLO-02) Able to master scientific concepts and principles comprehensively, and to develop procedures and strategies required for system analysis and design related to the areas of expertise of Power Systems Engineering, Control Systems Engineering, Multimedia Telecommunications, Electronics Engineering, Multimedia Smart Networks, or Telematics as provisions for further education or professional careers.

2. (CPL-03) Mampu memformulasikan permasalahan rekayasa dengan ide-ide baru untuk pengembangan teknologi dalam bidang keahlian Teknik Sistem Tenaga, Teknik Sistem Pengaturan, Telekomunikasi Multimedia, Teknik Elektronika, Jaringan Cerdas Multimedia, atau Telematika.

(PLO-03) Able to formulate engineering problems with new ideas for technology development in the fields of expertise in Power Systems Engineering, Control Systems Engineering, Multimedia Telecommunications, Electronics Engineering, Multimedia Smart Networks, or Telematics.

3. (CPL-04) Mampu mengimplementasikan teknologi informasi dan komunikasi dalam konteks pelaksanaan pekerjaannya..

(PLO-04) Able to implement information and communication technology in the context of carrying out his/her work.
Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes
1. Mampu memahami konsep dasar dan teknik didalam pemrosesan sinyal multimedia berdasar standard teknologi multimedia pada saat ini. <i>/Able to understand the basic concepts and techniques in multimedia signal processing based on current multimedia technology standards.</i> 2. Mampu menjelaskan prinsip-prinsip pemrosesan sinyal multimedia berbasis teknologi multimedia saat ini. <i>/Able to explain the principles of multimedia signal processing based on current multimedia technology.</i> 3. Mampu menerapkan pengetahuan yang didapat ke masalah dan proyek multimedia tertentu. <i>/Able to apply acquired knowledge to specific multimedia problems and projects.</i> 4. Mampu menunjukkan sikap bertanggungjawab atas pekerjaan di bidang keahliannya secara mandiri. <i>/Able to demonstrate a responsible attitude towards work in his/her field of expertise independently.</i> 5. Mampu bekerja sama untuk dapat memanfaatkan semaksimal mungkin potensi yang dimiliki. <i>/Able to work together to make the most of the potential that is available.</i> 6. Mampu menemukan solusi terhadap research gap dari makalah pengolahan sinyal multimedia <i>/Able to find solutions to research gaps in multimedia signal processing papers.</i>
Pokok Bahasan / Contents
1. Digital Signal Processing: Gelombang, Amplitudo, Frekuensi dan fasa, Signal to Noise ratio, filter sinyal digital. <i>/Digital Signal Processing: Waveform, Amplitude, Frequency and phase, Signal to Noise ratio, digital signal filters.</i> 2. Transformasi Fourier: Komponen frekuensi data audio dan video, domain frekuensi, theorem fourier 1 D dan 2D, magnitude, fasa dan representasi frekuensi waktu. <i>/Fourier Transform: Frequency components of audio and video data, frequency domain, 1D and 2D Fourier theorem, magnitude, phase and time-frequency representation.</i> 3. Filter Digital: Low Pass Filters, High Pass filter, Band-Pass Filters, Transformasi Fourier dan konvolusi. <i>/Digital Filters: Low Pass Filters, High Pass filters, Band-Pass Filters, Fourier Transforms and convolutions.</i> 4. Data Multimedia: Media diskrit dan kontinu, Konversi analog/digital, text ,audio , grafik, citra dan video. <i>/Multimedia Data: Discrete and continuous media, Analog/digital conversion, text, audio, graphics, images and video.</i> 5. Algoritma kompresi: Shannon dan Kolmogorov, Lossless dan Loss Compression, Algoritma kompresi Lossless , Repetitive Sequence Suppression, Run-Length Encoding, Pattern Substitution, Entropy Encoding, Shannon-Fano Algorithm, Huffman Coding, Arithmetic Coding <i>/ Compression algorithms: Shannon and Kolmogorov, Lossless and Loss Compression, Lossless compression algorithm, Repetitive Sequence Suppression, Run-Length Encoding, Pattern Substitution, Entropy Encoding, Shannon-Fano Algorithm, Huffman Coding, Arithmetic Coding</i>
Prasyarat / Pre-requisite
-
Pustaka / Reference
Utama / Primary: 1. Alan C. Bovik, "Handbook of Image and Video Processing ", Academic Press, 2000

Pendukung / *Supporting*:

2. Rafael C. Gonzalez, "Digital Image Processing", 3rd Ed., Pearson Education, 2008