



INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS
DEPARTEMEN TEKNIK ELEKTRO
Program Studi Sarjana (S1) Teknik Telekomunikasi

INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FACULTY OF INTELLIGENT ELECTRICAL & INFORMATICS TECHNOLOGY
DEPARTMENT OF ELECTRICAL ENGINEERING
Bachelor Degree Program in Telecommunication Engineering

1	Nama Mata Kuliah / Course Name : Pengolahan Sinyal Multimedia / <i>Multimedia Signal Processing</i>
2	Kode Mata Kuliah / Course Code : EL234502
3	Kredit / Credits : 3 SKS
4	Semester / Semester : 3

Deskripsi Mata Kuliah / Course Description

Mata kuliah Pengolahan Sinyal Multimedia ini membahas tentang berbagai proses pengolahan informasi digital dalam bentuk gambar/citra diam (still image), gambar bergerak (video) dan audio, serta bisa merealisasikannya dalam bentuk program Matlab. Proses pengolahan citra berlaku untuk citra keabuan, citra biner dan citra berwarna, baik dalam domain spasial dan dalam domain frekuensi. Selain itu juga membahas tentang proses pengolahan sinyal video dan audio, yang selanjutnya bisa diaplikasikan untuk berbagai keperluan di bidang telekomunikasi. / *Multimedia Signal Processing course discusses various digital information processing processes in the form of still images, moving images (video) and audio, and can realize them in the form of Matlab programs. Image processing applies to gray images, binary images and color images, both in the spatial domain and in the frequency domain. It also discusses processing of video and audio signals, which can then be applied for various purposes in telecommunications. various purposes in the field of telecommunications.*

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

1. (CPL-02) Mampu mengkaji dan memanfaatkan ilmu pengetahuan dan teknologi dalam rangka mengaplikasikannya pada bidang Teknik Telekomunikasi, serta mampu mengambil keputusan secara tepat dari hasil kerja sendiri maupun kerja kelompok dalam bentuk laporan tugas akhir atau bentuk kegiatan pembelajaran lain yang luarannya setara dengan tugas akhir melalui pemikiran logis, kritis, sistematis dan inovatif. / *Able to study and utilize science and technology in order to apply it in the field of Telecommunication Engineering, and be able to make decisions appropriately from the results of their own work and group work in the form of a final project report or other forms of learning activities whose output is equivalent to the final project through logical, critical, systematic and innovative thinking, systematic and*

innovative thinking.

2. (CPL-04) Mampu menerapkan ilmu pengetahuan alam dan matematika serta teknologi dan rekayasa informasi untuk memperoleh pemahaman komprehensif pada bidang Teknik Telekomunikasi. / *Able to apply natural science and mathematics as well as technology and information engineering to gain a comprehensive understanding of the field of Telecommunication Engineering.*
3. (CPL-08) Mampu mengetahui dan mengaplikasi metode dan keahlian sesuai perkembangan terkini di bidang ilmu pengetahuan dan teknologi untuk menyelesaikan permasalahan di bidang Teknik Telekomunikasi dengan mengedepankan nilai-nilai universal. / *Able to know and apply methods and expertise according to the latest developments in the field of science and technology to solve problems in the field of Telecommunication Engineering by prioritizing universal values.*

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Mampu menyebutkan berbagai properti citra digital dan parameter sinyal video. / *Able to mention various digital image properties and video signal parameters.*
2. Mampu memahami berbagai proses pengolahan citra digital baik dalam ruang warna, citra keabuan dan citra biner. / *Able to understand various digital image processing processes both in color space, gray image and binary image.*
3. Mampu memahami fungsi pengolahan citra digital dalam domain spasial dan domain frekuensi. / *Able to understand digital image processing functions in the spatial domain and frequency domain.*
4. Mampu memahami berbagai contoh pengolahan citra digital dan aplikasinya dalam sistem telekomunikasi. / *Able to understand various examples of digital image processing and its applications in telecommunication systems.*
5. Mampu membuat program Matlab untuk pengolahan sinyal video & audio. / *Able to create Matlab programs for video & audio signal processing.*

Pokok Bahasan / Contents

1. Pengantar Pengolahan Citra Digital / *Introduction to Digital Image Processing*
2. Operasi Dasar Pengolahan Citra Digital / *Basic Operations of Digital Image Processing*
3. Transformasi Geometri Citra / *Image Geometry Transformation*
4. Kernel, Konvolusi & Filter / *Kernels, Convolution & Filters*
5. Filter-Filter Khusus (ND Filter & Deteksi Tepi) / *Specialty Filters (ND Filter & Edge Detection)*
6. Transformasi Citra Digital dan aplikasinya. / *Digital Image Transformation and its applications.*
7. Ukuran Kualitas Citra / *Image Quality Measures*
8. Gangguan Kualitas Citra (Noise, Blur, Kompresi Citra) / *Image Quality Disorders (Noise, Blur, Image Compression)*
9. Beberapa Contoh Kasus Pengolahan Citra (Segmentasi Citra, Watermarking, Steganografi & Kriptografi) / *Some Case Examples of Image Processing (Image Segmentation, Watermarking, Steganography & Cryptography)*
10. Contoh Pengolahan Sinyal Video & Audio / *Video & Audio Signal Processing Examples*

Prasyarat / Pre-requisite

Pengolahan Sinyal Digital / *Digital Signal Processing*

Pustaka / Reference

Utama / *Primary* :

1. R.C. Gonzales & R.E. Woods, "Digital Image Processing, 4-th Edition", Pearson Education Limited, 2018.
2. R.C. Gonzales, R.E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Gatesmark Publishing, 2009.
3. D. Sundararajan, "Digital Image Processing: A Signal Processing and Algorithmic Approach", © Springer Nature Singapore Pte Ltd., 2017

Pendukung / *Supporting* :

1. Sarifuddin Madenda, "Pengolahan Citra & Video Digital: Teori, Aplikasi, dan Pemrograman Menggunakan MATLAB", Penerbit Erlangga, 2015.
2. P.N. Andono, T. Sutojo, Muljono, "Pengolahan Citra Digital". Penerbit ANDI Yogyakarta, 2017. Hwei Hsu, Ph.D., Schaum's outline of theory and problems of Analog and Digital Communications, 2nd Edition, Mc-Graw Hill, 2003.