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

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

1	**Nama Mata Kuliah / *Course Name***	:	Pengolahan Sinyal Digital / *Digital Signal Processing*
2	**Kode Mata Kuliah / *Course Code***	:	EE234501
3	**Kredit / *Credits***	:	2 SKS
4	**Semester / *Semester***	:	5

Deskripsi Mata Kuliah / *Course Description*

Mata kuliah Pengolahan Sinyal Digital membahas tentang sistem pengkondisian sinyal, rangkaian sistem konversi sinyal Digital ke Analog (DAC), dan sinyal Analog ke Digital (ADC), teknik sampling dan rekonstruksi, teori Nyquist dan aliasing, analisa sinyal dan sistem waktu diskrit menggunakan transformasi Z, algoritma DFT-IDFT, dan FFT-IFFT untuk analisa frekuensi sinyal dan sistem, disain filter Finite Impulse Response (FIR) dan Infinite Impulse Response (IIR). / *The Digital Signal Processing course covers signal conditioning systems, circuits for converting digital signals to analog (DAC) and analog signals to digital (ADC), sampling and reconstruction techniques, Nyquist theory and aliasing, analysis of discrete-time signals and systems using the Z-transform, DFT-IDFT algorithms, FFT-IFFT for signal and system frequency analysis, and design of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters.*

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

CPL 2 Mampu mengkaji dan memanfaatkan ilmu pengetahuan dan teknologi dalam rangka mengaplikasikannya pada bidang teknik elektro, 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 examine and utilize knowledge and technology for the purpose of applying them in the field of electrical engineering, and making informed decisions based on individual work as well as group work in the form of*

final reports or other learning activities whose outcomes are equivalent to final projects, through logical, critical, systematic, and innovative thinking.

CPL 5 Mampu mendesain komponen, sistem, dan proses yang logis dan realistis sesuai dengan spesifikasi yang ditentukan dengan mempertimbangkan aspek keselamatan, sosial, budaya, lingkungan, dan ekonomi / *Able to design components, systems, and processes that are logical and realistic in accordance with specified specifications, while considering safety, social, cultural, environmental, and economic aspects.*

CPL 7 Mampu mengetahui dan mengaplikasi metode, keahlian sesuai perkembangan terkini di bidang ilmu pengetahuan dan teknologi untuk menyelesaikan permasalahan teknik elektro dengan mengedepankan nilai-nilai universal / *Able to understanding and applying the latest methods and skills in the field of science and technology to solve electrical engineering problems while emphasizing universal values.*

Capaian Pembelajaran Mata Kuliah / *Course Learning Outcomes*

1. Mampu menjelaskan dan merancang rangkaian Pengkondisian Sinyal / *Able to explain and design Signal Conditioning Circuits.*
2. Mampu menganalisis dan merancang rangkaian DAC & ADC. / *Able to analyze and design DAC & ADC circuits.*
3. Mampu menganalisis proses sampling sinyal waktu kontinyu menjadi sinyal waktu diskrit, serta mampu merekonstruksi Kembali sinyal diskrit ke sinyal waktu kontinyu. / *Able to analyze the process of sampling continuous-time signals into discrete-time signals and can reconstruct discrete-time signals into continuous-time signals.*
4. Mampu menganalisis sinyal & sistem LTI waktu diskrit menggunakan transformasi-z. / *Able to analyze discrete-time signals & LTI systems using the Z-transform.*
5. Mampu menganalisis spektral sinyal secara komputasi menggunakan algoritma FFT-IFFT. / *Able to computationally analyze signal spectra using FFT- IFFT algorithms.*
6. Mampu mendisain filter digital FIR. / *Able to design digital FIR filters.*
7. Mampu mendesain filter digital IIR. / *Able to design digital IIR filters.*

Pokok Bahasan / *Contents*

1. Sistem pengkondisian sinyal / *Signal conditioning systems*
2. ADC dan DAC / *ADC and DAC*
3. Sampling dan Rekonstruksi / *Sampling and reconstruction*
4. Analisis frekuensi Sinyal dan Sistem LTI waktu diskrit / *Frequency analysis of signals and discrete-time LTI systems*
5. Algoritma FFT-IFFT / *FFT-IFFT algorithms*
6. Disain Filter Digital FIR / *Digital FIR filter design*
7. Disain Filter Digital IIR / *Digital IIR filter design*

Prasyarat / *Pre-requisite*

Sinyal dan Sistem & Rangkaian Analog / Signals and Systems & Analog Circuits

Pustaka / *Reference*

1. Data Acquisition Handbook, A Reference For DAQ And Analog & Digital Signal Conditioning, 3th Ed. Measurement Computing Corporation, 2012.
2. John G Proakis and Dimitris G, Manokalis, Digital Signal Processing: Principles, algoritms and applications, 4th Edition, Pearson International
3. Edition, 2014.
4. Viney K Ingle and John G Proakis, Digital Signal Processing using Matlab, 3rd Ed., CENGAGE Learning, USA, 2012
5. Monson H Hayes, Digital Signal Processing, Schaum's Outline Series, McGraw-Hill Companies, Inc., USA, 1999