Mata Kuliah ***Course***	Nama MK *Name*	:	Pengolahan Sinyal Digital *Digital Signal Processing*
	Kode MK *Code*	:	EE184403
	Kredit *Credits*	:	3 sks
	Semester *Semester*	:	IV (Wajib) *IV (Compulsory)*
	Beban Belajar *Workload*	:	Kuliah : 3 x 50 = 150 menit/minggu Latihan/tugas : 3 x 60 = 180 menit/minggu Belajar mandiri : 3 x 60 = 180 menit/minggu *Lectures : 3 x 50 = 150 min/week* *Exercises/Assignments : 3 x 60 = 180 min/week* *Self learning : 3 x 60 = 180 min/week*
	Tingkatan *Module Level*	:	Sarjana (S1) *Undergraduate*
	Penanggung Jawab *PIC*	:	Dr. Ir. Titiek Suryani, MT
	Pengajar *Lecturer*	:	Dr. Ir. Titiek Suryani, MT
	Bahasa *Language*	:	Bahasa Indonesia dan Bahasa Inggris *Bahasa Indonesia and English*
	Persyaratan dan Peraturan *Requirement and Regulation*	:	Setiap mahasiswa harus menghadiri setidaknya 75% dari jumlah perkuliahan untuk dapat mengikuti ujian *A student must have attended at least 75% of the lectures to sit in the exams*

Deskripsi Mata Kuliah
Description of Course

Mata kuliah Pengolahan Sinyal Digital membahas tentang sinyal diskrit dan konsep sistem LTI waktu diskrit, bagaimana rangkaian realisasi sistem waktu diskrit berdasarkan persamaan beda, analisis frekuensi sinyal dan sistem waktu diskrit, konsep mengubah sinyal waktu kontinyu menjadi sinyal waktu diskrit dengan teknik sampling, teori Nyquist dan aliasing, analisis sinyal dan sistem waktu diskrit menggunakan transformasi Z, algoritma DFT-IDFT, dan FFT-IFFT untuk analisis frekuensi sinyal dan sistem secara komputasi, disain filter Finite Impulse Response (FIR) dan Infinite Impulse Response (IIR).

Digital Signal Processing course discusses discrete signals and discrete time LTI system concepts, how a series of discrete time system is realized based on different equations, signal frequency analysis and discrete time systems, the concept of converting continuous time signals into discrete time signals with sampling techniques, Nyquist theorem and aliasing, signal analysis and discrete time systems use Z transforms, DFT-IDFT algorithms, and FFT-IFFT for computational signal and system analysis, Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters.

CPL Prodi yang Dibebankan

Learning Outcomes

(CPL-01) Mampu menerapkan ilmu pengetahuan alam dan matematika pada bidang teknik elektro

(PLO-1) Capable to apply knowledge of natural sciences and mathematics to solve electrical engineering problem

(CPL-03) Mampu mendesain komponen, sistem, dan proses yang logis dan realistis sesuai dengan spesifikasi yang ditentukan dengan mempertimbangkan aspek keselamatan, sosial, budaya, lingkungan, dan ekonomi

(PLO-3) Capable to design logical and realistic components, systems and processes in accordance with specified specifications by considering safety, social, cultural, environmental and economic aspects

(CPL-10) Mampu mengetahui dan menyikapi perkembangan terkini dibidang ilmu pengetahuan dan teknologi dengan mengedepankan nilai-nilai universal

(PLO-10) Capable to know and respond to the latest developments in science and technology by promoting universal values

Capaian Pembelajaran Mata Kuliah

Course Learning Outcomes

(CPMK-01) Menguasai konsep sinyal dan sistem diskrit dalam ranah waktu, ranah frekuensi dan frekuensi kompleks serta disain filter digital IIR dan FIR.
(CLO-01) Mastering the concepts of discrete signals and systems in the time domain, complex frequency and frequency domains and digital filter design IIR and FIR.

(CPMK-02) Mampu menganalisis sinyal dan sistem diskrit dalam ranah waktu, ranah frekuensi dan frekuensi kompleks serta disain filter digital IIR dan FIR.
(CLO-02) Able to analyze discrete signals and systems in time domain, complex frequency and frequency domains as well as digital filter design IIR and FIR

(CPMK-03) Mampu menggunakan software Matlab/Simulink untuk melakukan visualisasi dan eksperimentasi konsep sinyal dan sistem linear waktu diskrit serta disain filter digital IIR dan FIR.
(CLO-03) Able to use Matlab / Simulink software to visualize and experiment signal concepts and discrete time linear systems and design digital filters IIR and FIR.

(CPMK-04) Menunjukkan sikap bertanggung jawab atas pekerjaan di bidang keahliannya secara mandiri.
(CLO-04) Demonstrate the attitude of being responsible for work in his area of expertise independently.

(CPMK-05) Bekerja sama untuk dapat memanfaatkan semaksimal mungkin potensi yang dimiliki.
(CLO-05) Working together to be able to make the most of his/her potential.

Topik/Pokok Bahasan

Main Subjects

1. Konsep Sinyal dan system waktu diskrit
   Concept of Signal and System of Discrete Time
2. Sistem LTI waktu diskrit

Linear Time Invariant Discrete Time

3. Analisis frekuensi Sinyal dan Sistem LTI waktu diskrit
   Frequency Analysis of Signal and Linear Time Invariant System in Discrete Time
4. Sampling dan Rekonstruksi
   Sampling and Reconstruction Sampling dan Rekonstruksi
5. Transformasi-Z
   Z Transform
6. DFT-IDFT dan FFT-IFFT
   DFT-IDFT and FFT-IFFT
7. Disain Filter Digital FIR
   FIR Digital Filter Design
8. Disain Filter Digital IIR
   IIR Digital Filter Design

Pembelajaran dan ujian
Study and examination

- Latihan di kelas
  In-class exercises
- Tugas 1, 2, 3
  Assignment 1, 2, 3
- Ujian tengah semester
  Mid-term examination
- Ujian akhir semester
  Final examination

Pustaka
Reference(s)

[1] John G Proakis and Dimitris G, Manokalis, Digital Signal Processing: Principles, algoritms and applications, 4th Edition, Pearson International Edition, Pearson Prentice-Hall, NewJersey, 2007.
[2] Monson H Hayes, Digital Signal Processing, Schaum's Outline Series, McGraw-Hill Companies, Inc., USA, 1999
[3] Lonnie C Ludeman, Fundamentals of Digital Signal Processing, Wiley,1986.
[4] Viney K Ingle and John G Proakis, Digital Signal Processing using Matlab, 3rd Ed., CENGAGE Learning, USA, 2012.

Prasyarat
Prerequisite(s)

EE184305 Sinyal dan Sistem
EE184305 Signals and Systems