



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 : Rangkaian Analog / <i>Analog Circuits</i>
2	Kode Mata Kuliah / Course Code : EE234406
3	Kredit / Credits : 3 SKS
4	Semester / Semester : 4

Deskripsi Mata Kuliah / Course Description

Mata kuliah Rangkaian Analog membahas tentang karakteristik rangkaian integrasi penguat operasional, konsep feedback negatif dan positif, rangkaian penguat, komparator, detector level tegangan, hysteresis, rangkaian pembangkit gelombang persegi, segitiga, gigi gergaji, osilator Wien, dan komputer analog, integrator, diferensiator, serta filter aktif Butterworth LPF, HPF, BPF, dan BSF yang diimplementasikan pada penguat operasional / *The Analog Circuits course covers the characteristics of operational amplifier integration circuits, the concept of negative and positive feedback, amplifier circuits, comparators, voltage level detectors, hysteresis, square wave, triangle wave, sawtooth wave generators, Wien bridge oscillator, and analog computers. It also includes the study of integrators, differentiators, and active filters like Butterworth low-pass, high-pass, band-pass, and band-stop filters implemented using operational amplifiers.*

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

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 6	Mampu mengkaji dan memanfaatkan matematika, ilmu pengetahuan alam dan teknologi serta mengidentifikasi, memformulasikan dan menyelesaikan permasalahan di bidang teknik elektro / <i>Able to evaluate and utilize mathematics, natural sciences, and technology, as well as identify, formulate, and solve problems in the field of electrical engineering.</i>
Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes	
<ol style="list-style-type: none"> 1. Mampu menerapkan rangkaian analog feedback negatif pada penguat operasional. / <i>Able to apply negative feedback analog circuits to operational amplifiers.</i> 2. Mampu menerapkan rangkaian analog feedback positif pada penguat operasional. / <i>Able to apply positive feedback analog circuits to operational amplifiers.</i> 3. Mampu menerapkan rangkaian pembangkit sinyal dan osilator pada penguat operasional / <i>Able to apply signal generator and oscillator circuits to operational amplifiers</i> 4. Mampu menerapkan komputer analog pada penguat operasional. / <i>Able to apply analog computing with operational amplifiers.</i> 5. Mampu menerapkan filter aktif Butterworth pada penguat operasional / <i>Able to apply active Butterworth filters to operational amplifiers.</i> 	
Pokok Bahasan / Contents	
<ol style="list-style-type: none"> 1. Karakteristik dasar rangkaian integrasi penguat operasional / <i>Basic characteristics of operational amplifier integration circuits.</i> 2. Amplifier : Inverting, Non-inverting, adder, bridge, buffer, multi tahap, diferensial, dan instrumentasi / <i>Amplifier: Inverting, Non-Inverting, Adder, Bridge, Buffer, Multi-Stage, Differential, and Instrumentation.</i> 3. Komparator : open loop (zero crossing detector), feedback positif (dengan atau tanpa hysteresis) / <i>Comparators: open-loop (zero-crossing detector), positive feedback (with or without hysteresis).</i> 4. Rangkaian pembangkit sinyal, dan osilator (Wien, Hartley & Colpitt) / <i>Signal generator circuits and oscillators (Wien, Hartley & Colpitt).</i> 5. Komputer analog (Integrator dan differentiator) / <i>Analog computers (Integrator and Differentiator).</i> 6. Filter aktif Butterworth (LPF, HPF, BPF, BSF) / <i>Active Butterworth filters (LPF, HPF, BPF, BSF).</i> 	
Prasyarat / Pre-requisite	
Rangkaian Elektronika / <i>Electronic Circuits</i>	
Pustaka / Reference	
<ol style="list-style-type: none"> 1. Robert F Coughlin, Frederick F Driscoll, Operational Amplifier and Linear Integrated Circuit, 6th Ed. Prentice-Hall International, 2001. 2. James M. Fiore, Operational Amplifiers & Linear Integrated Circuits: Theory and Application, 3th Ed. Creative Commons license, 2020 3. Ramakant A Gayakward, Op-Amp dan Linear Integrated Circuits, 4th Ed. Prentice-Hall, 2001. 	