



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

1	Nama Mata Kuliah/ Course Name	:	Sistem Digital/ Digital System
2	Kode Mata Kuliah/ Course Code	:	EE234307
3	Kredit/ Credits	:	2 SKS
4	Semester/ Semester	:	2

Deskripsi Mata Kuliah/ Course Description

Mata kuliah Sistem Digital memberikan pengetahuan dan kemampuan kepada mahasiswa untuk memahami, menganalisis, dan merancang rangkaian digital yang menjadi dasar dari sebagian besar sistem elektronika saat ini. Materi meliputi dasar konsep digital termasuk sistem bilangan, serta analisis dan desain rangkaian digital berupa rangkaian kombinasional dan rangkaian sekuensial. Pengantar teknologi IC digital juga diberikan untuk memahami implementasi rangkaian digital untuk solusi permasalahan nyata. Mata kuliah ini juga menjadi dasar untuk implementasi rangkaian elektronika digital lanjut, misalnya desain mikroprosesor, dan implementasi dengan programmable logic.

The Digital Systems course provides students with the knowledge and skills to understand, analyze, and design digital circuits which are the basis of most of today's electronic systems. The material covers basic digital concepts including number systems, as well as the analysis and design of digital circuits in the form of combinational circuits and sequential circuits. An introduction to digital IC technology is also given to understand the implementation of digital circuits for real problem solutions. This course is also the basis for the implementation of advanced digital electronics circuits, for example microprocessor design, and implementation with programmable logic.

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

1. (CPL-03) Mampu mengelola pembelajaran diri sendiri, dan mengembangkan diri sebagai pribadi pembelajar sepanjang hayat untuk bersaing di tingkat nasional, maupun internasional, dalam rangka berkontribusi nyata untuk menyelesaikan masalah dengan mengimplementasikan teknologi informasi dan komunikasi dan memperhatikan prinsip keberlanjutan serta memahami kewirausahaan berbasis teknologi.

(PLO-03) *Able to manage self-learning and develop oneself as a lifelong learner to compete at national and international levels, in order to make a real contribution to solving problems by implementing information and communication technology and paying attention to sustainability principles and understanding technology-based entrepreneurship.*

2. (CPL-5) Mampu merancang komponen, sistem, dan proses yang logis dan realistis sesuai dengan spesifikasi yang ditentukan dengan mempertimbangkan aspek keselamatan, sosial, budaya, lingkungan, dan ekonomi.

(PLO-5) *Able to design components, systems, and/or processes to meet desired needs within realistic constraints in such aspects as law, economic, environment, social, politics, health and safety, sustainability as well as to recognize and/or utilize the potential of local and national resources with global perspective.*

3. (CPL-07) Mampu mengidentifikasi, memformulasikan, menganalisis, dan menyelesaikan permasalahan kompleks di bidang teknik telekomunikasi
(PLO-07) *Able to identify, formulate, analyze, and solve the complex problems in the field of Telecommunication Engineering.*

Capaian Pembelajaran Mata Kuliah/ Course Learning Outcomes

1. Mampu memahami konsep digital, sistem bilangan, gerbang logika dasar, dan aljabar boolean/ *Be able to understand digital concepts, number systems, basic logic gates, and boolean algebra.*
2. Mampu menerapkan analisis, desain, dan penyederhanaan rangkaian kombinasional/ *Be able to apply the analysis, design, and simplification of combinational circuits.*
3. Mampu menerapkan analisis dan desain rangkaian sekuensial/ *Able to apply sequential circuit analysis and design*
4. Mampu mengenal dasar teknologi IC digital/ *Able to know the basic of digital IC technology*

Pokok Bahasan/ Contents

1. Konsep dasar digital, sistem bilangan dan kode biner, aljabar Boolean, gerbang logika/ *Basic digital concepts, number systems and binary codes, Boolean algebra, logic gates.*
2. Analisis, sintesis, dan penyederhanaan rangkaian kombinasional, teknik Karnaugh map. Rangkaian kombinasional adder, two's complement, mux, decoder, encoder/ *Analysis, synthesis, and simplification of combinational circuits, the Karnaugh map technique. Adder, two's complement, combinational circuit, mux, decoder, encoder.*
3. Elemen penyimpan, latch, clock, flip-flop, register/ *Storage elements, latches, clocks, flip-flops, registers.*
4. Rangkaian sekuensial, counter, shift register, finite state machine Moore dan Mealy/ *Sequential circuits, counters, shift registers, finite state machines Moore and Mealy*
5. Pengantar teknologi IC digital, HDL, logic families CMOS dan TTL/ *Introduction to digital IC technology, HDL, logic families CMOS and TTL*

Prasyarat/ Pre-requisite
Pustaka/ Reference
Utama/ Primary : <ol style="list-style-type: none">1. Morris Mano, M., & Ciletti, M. D. (2013). Digital design: with an introduction to the Verilog HDL. 5th edition2. Sarah Harris and David Harris. 2015. Digital Design and Computer Architecture: ARM Edition (1st. ed.). Morgan Kaufmann Publishers Inc., San Francisco, CA, USA. https://dl.acm.org/doi/10.5555/2815529
Pendukung/ Support : <ol style="list-style-type: none">1. Floyd, Thomas L.. Digital Fundamentals, Global Edition, Pearson Education Limited, 2015.