



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 : Sistem Digital / <i>Digital Systems</i>
2	Kode Mata Kuliah / Course Code : EE234307
3	Kredit / Credits : 2 SKS
4	Semester / Semester : 3

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 knowledge and skills to understand, analyze, and design digital circuits, which form the foundation of many electronic systems today. The course covers basic digital concepts, including number systems, as well as the analysis and design of digital circuits, including combinational and sequential circuits. An introduction to digital IC technology is also provided to understand the implementation of digital circuits for real-world solutions. This course serves as the basis for advanced digital electronic circuit implementation, such as microprocessor design and programmable logic implementation*

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

CPL 3 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 / *Able to manage one's own learning and continually self-develop as a lifelong learner to compete at the national and international levels, with the goal of making a tangible contribution to problem-solving by implementing information and communication technology and considering sustainability principles, as well as understanding technology-based entrepreneurship.*

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 / *Able to evaluate and utilize mathematics, natural sciences, and technology, as well as identify, formulate, and solve problems in the field of electrical engineering.*

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

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

Pokok Bahasan / Contents

1. Konsep dasar digital, sistem bilangan dan kode biner, aljabar Boolean, gerbang logika. / *Basic Digital Concepts, Number Systems, and Binary Code Boolean Algebra Logic Gates*
2. Analisis, sintesis, dan penyederhanaan rangkaian kombinasional, teknik Karnaugh map. / *Analysis, Synthesis, and Simplification of Combinational Circuits, Karnaugh Map Technique*
3. Rangkaian kombinasional adder, two's complement, mux, decoder, encoder. / *Combinational Circuitry, Including Adders, Two's Complement, Multiplexers (MUX), Decoders, and Encoders*
4. Elemen penyimpan, latch, clock, flip-flop, register. / *Storage Elements, Latches, Clocking, Flip-Flops, and Registers*
5. Rangkaian sekuensial, counter, shift register, finite state machine Moore dan Mealy. / *Sequential Circuitry, Including Counters, Shift Registers, Finite State Machines (Moore and Mealy)*

6. Pengantar teknologi IC digital, HDL, logic families CMOS dan TTL. / *Introduction to Digital IC Technology, Hardware Description Language (HDL), CMOS, and TTL Logic Families*

Prasyarat / Pre-requisite

Pustaka / Reference

1. Morris Mano, M., & Ciletti, M. D. (2013). Digital design: with an introduction to the Verilog HDL. 5th edition
2. Sarah Harris and David Harris. 2015. Digital Design and Computer Architecture: ARM Edition (1st. ed.). Morgan Kaufmann Publishers Inc., San Francisco, CA, USA
3. Floyd, Thomas L.. Digital Fundamentals, Global Edition, Pearson Education Limited, 2015.