

ABSTRAK

RANCANG BANGUN MODUL *TRAINER* UNTUK BERBAGAI MACAM KOMPONEN ELEKTRONIKA

(2026: xvii + 73 Halaman + Daftar Pustaka + Lampiran)

ISNAIN

062330320593

JURUSAN TEKNIK ELEKTRO

PROGRAM STUDI DII TEKNIK ELEKTRONIKA

POLITEKNIK NEGERI SRIWIJAYA

Komponen elektronika merupakan materi dasar yang harus dipahami oleh mahasiswa Teknik Elektronika sehingga diperlukan media praktikum yang mampu mendukung proses pembelajaran secara efektif. Penelitian ini bertujuan merancang dan membangun modul *trainer* berbagai macam komponen elektronika. Modul *trainer* ini digunakan untuk mengukur nilai resistor dan kapasitor, menguji dioda, MOSFET tipe N-Channel dan P-Channel, serta IC gerbang logika AND, OR, NOT, NAND, NOR, XOR, dan XNOR. Sistem menggunakan mikrokontroler Arduino Nano sebagai pengendali utama, LCD 16×2 I2C sebagai media penampil hasil pengukuran, serta tombol pemilih mode. Hasil pengujian menunjukkan bahwa modul *trainer* mampu mengukur nilai resistor dengan rata-rata kesalahan sebesar 1,90%, kapasitor polar sebesar 4,19%, dan kapasitor nonpolar sebesar 0,40% dibandingkan dengan multimeter digital. Selain itu, modul mampu mengidentifikasi kondisi dioda, karakteristik MOSFET tipe N-Channel dan P-Channel, serta menghasilkan keluaran IC gerbang logika yang sesuai dengan tabel kebenaran. Berdasarkan hasil pengujian, modul *trainer* telah berfungsi dengan baik dan layak digunakan sebagai media pembelajaran serta praktikum elektronika dasar.

Kata Kunci: Trainer, Komponen Elektronika, Arduino Nano, MOSFET, IC Gerbang Logika.

ABSTRACT

DESIGN AND DEVELOPMENT OF A TRAINER MODULE FOR VARIOUS ELECTRONIC COMPONENTS

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ISNAIN

062330320593

DEPARTMENT OF ELECTRICAL ENGINEERING

ELECTRONICS ENGINEERING PROGRAM

SRIWIJAYA STATE POLYTECHNIC

Electronic components are fundamental materials that must be understood by Electronics Engineering students. Therefore, an effective practical learning medium is needed to support the learning process. This study aims to design and develop a trainer module for various electronic components. The trainer module is designed to measure resistor and capacitor values, test diodes, N-Channel and P-Channel MOSFETs, and logic gate ICs, including AND, OR, NOT, NAND, NOR, XOR, and XNOR gates. The system uses an Arduino Nano microcontroller as the main controller, a 16×2 I2C LCD to display measurement results, and push buttons for mode selection. The test results show that the trainer module is capable of measuring resistor values with an average error of 1.90%, polar capacitor values with an average error of 4.19%, and nonpolar capacitor values with an average error of 0.40% compared with a digital multimeter. In addition, the module is capable of identifying the condition of diodes, the characteristics of N-Channel and P-Channel MOSFETs, and producing logic gate outputs that are consistent with their corresponding truth tables. Based on the test results, the trainer module performed well and is suitable for use as a learning and laboratory practice medium for basic electronics.

Keywords: *Trainer Module, Electronic Components, Arduino Nano, MOSFET, Logic Gate ICs.*