

# LOW-COST TRAINER MULTI SUBJECTS MENGGUNAKAN REAL-TIME SIMULINK UNTUK PEMBELAJARAN BIDANG REKAYASA ELEKTRONIK

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## ABSTRACT

Various electronic trainer kits have appeared and have been easily available on the market causing the shifting paradigm in learning electronics engineering. Due to this condition, learning and designing electronics engineering gradually focus on the practical way. As a result, mastery of the electronic basic concepts has begun to be abandoned, so that students' abilities are low and students tend to be pragmatic, incompetent, and have difficulty adapting to the industrial world. This study aims to design and evaluate a low-cost trainer that can be used for learning several different subjects (multi subjects) in the field of electronics engineering. To realize this trainer, the prototype is simulated in MATLAB/Simulink using Waijung block set and implemented through hardware prototype using STM32F4 Microcontroller to verify the concept more tangible. This study uses a Research and Development (R&D) procedure. To investigate the results of the trainer's design, technical feasibility testing is carried out in the laboratory and a feasibility testing is carried out on learning with three different subjects in the laboratory. Due to the limitations of learning activities during the COVID19 period, data collection was carried out in adjusted courses in the current semester with the subject of the intelligent control system. The subject matter that was tested was three different learning materials, namely: PID control system, PID fuzzy control system, and PID neural network-based radial basis function control system. Based on the experimental results, it shows that the proposed trainer kit can verify the conceptual knowledge of the three subjects at a relatively low cost, simple, and low cost to reduce the gap between theory and practice.

*Kata Kunci: low-cost trainer kit, Electronics engineering, Multi-subject learning, STM32F4 microcontroller, MATLAB Real-time Simulink*