

## **ABSTRACT**

*Hydroponic planting is an alternative solution when an area does not have enough land to plant with soil media. Hydroponics is planting by changing the soil media into water media as a place for planting plants and nutrients. The purpose of this final project is to make controlled environmental engineering by the ideal conditions of pakcoy grown hydroponically in a greenhouse so that it can increase crop yields without being affected by environmental conditions.*

*The distribution of water in this system is divided into two, namely clean water and nutrient water. Both water distributions are controlled by a pump system installed in each water tank. The clean water tank delivers water to the nutrient water tank with automatic control. In the nutrient tank, the pump is on for 24 hours to drain the nutrient water to hydroponics, and monitoring the water discharge and volume is carried out.*

*The results of the clean water pump control system using the control method are on/off obtained values of rise time ( $t_r$ ) = 174 seconds, settling time ( $t_s$ ) = 309 seconds, and delay time ( $t_d$ ) = 54 seconds for filling up to a height of 20 cm in nutrient water. . In monitoring hydroponic nutrient irrigation, the water discharge is 5.04 L/m and the volume of water flowing every hour is around 306.5 L. This result is obtained because the nutrient water is not used up and is used repeatedly. The result of the comparison between the controlled and uncontrolled systems is that the controlled system has a higher average height of 21.81 cm while the uncontrolled is 20.45 cm and the controlled leaf width average is 8.02 cm while the uncontrolled is 5.11 cm*

**Keywords:** *Greenhouse, Hydroponics, Irrigation, On/Off Control, Pakcoy, Water Pump.*