

# 2023 MODULE DESCRIPTION

BACHELOR PROGRAM  
AGRICULTURAL ENGINEERING  
FACULTY OF AGRICULTURE  
HASANUDDIN UNIVERSITY  
2023



## Instrumentation Engineering

### Semester 3

|   |  |
|---|--|
| Module designation  | <i>Instrumentation Engineering</i>   |
| Semester(s) in which the module is taught                     | <i>III</i>   |
| Person responsible for the module                             | <i>Dr. Ir. Abdul Waris, MT<br/>Dr. Abdul Azis, STP., M.Si<br/>Muhammad Tahir Sapsal, STP., M.Si</i>  |
| Language  | <i>Indonesia</i>   |
| Relation to curriculum  | <i>Compulsory</i>  |
| Teaching methods  | <i>Lab works</i>   |
| Workload (incl. contact hours, self-study hours)              | <i>(Estimated) Total workload:<br/>2 SKS x 1.7 = 3.4 ECTS = 91.8 hours</i> <ul style="list-style-type: none"> <li>• <i>Lecture = 23.3 hours</i></li> <li>• <i>Excercise = 28 hours</i></li> <li>• <i>Sel study = 28 hours</i></li> <li>• <i>Exam = 4 hours (MID term and final)</i></li> <li>• <i>Exam preparation = 8.5 hours</i></li> </ul>  |
| Credit points   | <i>2 SKS = 3.4 ECTS</i>  |
| Required and recommended prerequisites for joining the module |  |
| Module objectives/intended learning outcomes                  | <i>ILO 3: Apply knowledge of mathematics, sciences, and engineering principles in agricultural fields; (Knowledge 1)</i><br><i>ILO 5: Use techniques, skills, and modern tools necessary for agricultural engineering practices; (Skill 1)</i><br><i>ILO 6: manage and utilize agricultural resources effectively, efficiently, and sustainably; (Skill 2)</i>   |
| Content   | <ul style="list-style-type: none"> <li>• <i>the definition and scope.</i></li> <li>• <i>Explain units of measurement and measurement error measurement.</i></li> <li>• <i>Explain the working principle of various electrical sensors electrical sensors.</i></li> <li>• <i>Explain the static and dynamic characteristics of electrical sensors characteristics.</i></li> <li>• <i>o analyze various methods of converting physical quantities to analog electrical quantities.</i></li> <li>• <i>Design a converter for converting sensor data into analog voltage in the form of analog voltage.</i></li> <li>• <i>To master the concept of amplification and be able to design a sensor data amplifier</i></li> <li>• <i>Convert analog data to digital data by creating a conversion program (ADC) on a computer,</i></li> <li>• <i>Converting digital data to actual data measurement data by creating a mathematical program (polynomial and linear).</i></li> <li>• <i>Explain the concept of converting digital data to actual measurement data using a computer system. actual measurement data by using an expert system and fuzzy logic</i></li> </ul> |

|                                    |   |
|------------------------------------|---|
|                                    | <ul style="list-style-type: none"> <li>• <i>Designing the construction of measuring instruments (analog and digital) that are commonly used in the field of Engineering</i></li> </ul>  |
| Examination forms                  | <i>Writing and oral exam</i>  |
| Study and examination requirements | <i>Attendance above 80%</i>   |
| Reading list                       | <ul style="list-style-type: none"> <li>• <i>Doebelin, Ernest O., 1990, Measurement system, Application and design, fourth edition, McGraw-Hill International edition.</i></li> <li>• <i>Yan J., Ryan, M. dan Power, J. 1994. Using Fuzzy Logic, Prentice - Hall International, Inc</i></li> <li>• <i>Budiharto, W. 2008. Panduan Praktikum Mikrokontroler AVR Atmega16. Elex Media Komputindo Kelempok Gramedia, Jakarta.</i></li> <li>• <i>William Siler and James J. Buckley, 2005. Fuzzy-Expert systems-and-Fuzzy-Reasoning. Published by John Wiley &amp; Sons, Inc., Hoboken, New Jersey.</i></li> </ul> |