

Module Description

Module name	Sensor System Laboratory
Module level, if applicable	Bachelor of Physics
Code, if applicable	18H02131303
Subtitle, if applicable	-
Course, if applicable	-
Semester(s) in which the module is taught	5 th
Person responsible for the module	Prof. Dr. Arifin, M. T.
Lecturer	Prof. Dr. Arifin, M.T.
Language	Indonesian Language [Bahasa Indonesia]
Relation to Curriculum	This course is a compulsory course and offered in the 5 th semester.
Type of teaching, contact hours	Teaching methods: [group discussion], [simulation], [project based learning], [problem-based learning]. Teaching forms: [lecture], [tutorial], [practicum] CH : 08.00 - 16.00
Workload	For this course, students are required to meet a minimum of 45.33 hours in one semester, which consist of: - 13.33 hours for lecture, - 32.00 hours for private study
Credit points	1 credit points (equivalent with 1.7 ECTS)
Requirements according to the	Students have participated in at least 80% of the learning activities

examination regulations	
Recommended prerequisites	Basic Physics 1 and Basic Physics 2
Module objectives/intended learning outcomes	After completing the course, Students are able: Intended Learning Outcomes (ILO): ILO 4 : Students have capability to operate the physical instrumentation in the laboratory and conduct experiments and interpret the result. Course Learning Objective (CLO): After completing this course, students are expected to be able to: 1. Explain the basic principles of sensor systems and sensor applications. 2. Solid understanding of the introduction of characteristics of sensors and sensor applications. 3. Describe the features, characteristics, and functions of sensors. 4. Analyze the characteristics of sensors and analyze the function of sensors in various applications. Sub CLO : ILO 4 $\Rightarrow$ CLO 1: Able to explain the basic sensor system. ILO 4 $\Rightarrow$ CLO 2: Students are able to recognize the characteristics and general characteristics of the sensor. ILO 4 $\Rightarrow$ CLO 3: Students are able to explain the characteristics, characteristics and functions of sensors: acceleration, vibration, displacement, flow, level, mass, load, and force. ILO 4 $\Rightarrow$ CLO 4: Students are able to explain features, characteristics and functions: biosensors, chemical sensors, humidity, gas and pH. ILO 4 $\Rightarrow$ CLO 5: Students are able to explain the characteristics, characteristics & functions of sensors: radiation, position, motion, pressure, strain & temperature. ILO 4 $\Rightarrow$ CLO 6: Students are able to explain the characteristics, characteristics & functions of optical fiber-based sensors
Content	Students will learn about : 1. Basic sensor system 2. Common features and characteristics of sensors 3. Acceleration and vibration sensors 4. Biosensors 5. Chemical sensors

	6. Displacement sensors 7. Flow and level sensors 8. Mass, load and force sensors 9. Humidity, gas and pH sensors 10. Radiation and optical sensors 11. Motion and position sensors 12. Pressure and strain sensors 13. Temperature sensors 14. Fiber optic based sensor
Forms of Assessment	Assessment techniques: [observation], [participation], [written test], [oral test] Assessment forms: [assignment], [report], [presentation] Assignment = 17.5%, Practicum = , Report = , Practicum examination = CLO 1 => ILO 4: 16% (Assignment: written test, practicum: observation, report: , practicum examination : oral test) CLO 2 => ILO 4: 16% (Assignment: written test, practicum: observation, report, practicum examination : oral test) CLO 3 => ILO 4: 17% (Assignment: written test, practicum: observation, report, practicum examination : oral test) CLO 4 => ILO 4: 17% (Assignment: written test, practicum: observation, report, practicum examination : oral test) CLO 5 => ILO 4: 17% (Assignment: written test, practicum: observation, report, practicum examination : oral test) CLO 6 => ILO 4: 17% (Assignment: written test, practicum: observation, report, practicum examination : oral test)
Study and examination requirements and forms of examination	Study and examination requirements: - Students must attend 15 minutes before the class starts. - Students must switch off all electronic devices. - Students must inform the lecturer if they will not attend the class due to sickness, etc. - Students must submit all class assignments before the deadline. - Students must attend the exam to get final grade. Form of examination: Written exam: Essay

Media employed	LED, Whiteboard, Learning Management System (SIKOLA)
Reading list	Main : • John S. Wilson, 2005, <i>Sensor Technology Handbook</i>, Elsevier. • Alan S. Moris, 2001, <i>Measurement and Instrumentation Principles</i>, third edition, Butterworth Heinemann • John G. Webster and Halit Eren, 2014, <i>Measurement, Instrumentation, and Sensor Handbook</i>, second edition, CRC Press. Support : • Alexius J. Hebra, 2010, <i>The Physics Meteorology</i>, Springer