

UNDERGRADUATE PROGRAM IN ELECTRONICS AND INSTRUMENTATION
DEPARTMENT OF COMPUTER SCIENCE AND ELECTRONICS
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS GADJAH MADA

Module name	Intelligent Instrumentation
Module level	Undergraduate
Code	MII-3817
Courses (if applicable)	Intelligent Instrumentation
Semester	Odd
Contact person	Ika Candradewi, S.Si., M.Cs.
Lecturer	Ika Candradewi, S.Si., M.Cs. / M. Idham Ananta Timur, S.T. M.Kom
Language	Bahasa Indonesia
Relation to curriculum	Undergraduate degree program; obligatory; 6 th or 8 th semester.
Type of teaching, contact hours	Undergraduate degree program: lectures, > 80 students,
Workload	1. Lectures: 3 x 50 = 150 minutes (2 hours 30 minutes) per week. 2. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. 3. Private study: 3 x 60 = 180 minutes (3 hours) per week.
Credit points	3 credit points (cr).
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.
Mandatory prerequisites	- Artificial Intelligent - Sensor and Transduser
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to: - CO1-be able to understand and understand the concept of intelligent instrumentation of a basic instrumentation system and sensor performance characteristics. (PLO2) - CO2- be able to students are able to understand and process information derived from the sensor output signal as well as analyze the dynamic signal and system (PLO3) - CO3-Be able to Students are able to understand and understand the working principles of various types of intelligent sensors and their utilization. (PLO2) - CO4-Be able to analyze and understand the process of linearization, calibration and compensation of a sensor (PLO2) - CO5-understand and process sensor data with artificial intelligence (Artificial Intelligence) (PLO3) - CO6-Students are able to understand and understand standard an protocol from intelligent sensor (PLO3) - CO7 - understand, process and analyze the working principle of intelligent sensor based on smart video sensor (RGB and Depth sensor) (PLO4)

	-CO8 - Students are able to analyze and understand the work of application of intelligent sensor systems, measurements and instruments involved in smart environment (PLO4)
Content	This course discusses the concepts and techniques of the design and methodology of intelligent instrumentation, intelligent instrumentation principle approaches on sensors and measuring instruments, so that students are able to adapt these concepts and techniques to implement intelligent instrumentation applications in the real world. This lecture refers to a book on intelligent instrumentation written for students on Computer Science / Informatics, Electrical Engineering, Computer Engineering, and intelligent instrumentation courses. This course also refers to papers related to intelligent sensors and instrumentation. Some of the topics discussed include intelligent sensors (signal processing operations: calibration, linearization, and compensation), intelligent signal processing implementations, artificial intelligence (Artificial Intelligence) on the instrument, smart video sensors in digital data processing.
Study and examination requirements and forms of examination	<ul style="list-style-type: none"> • Mid-terms examination and Final examination. • Final Project : Presentation
Media employed	LCD, whiteboard, websites, books (as references), etc.
Assessments and Evaluation	<p>CO1: Assignment 1 (5%) – 5 %</p> <p>CO2: Problem 1, 2 in mid-term exam(10%) and Assignment 2(5%) –15 %</p> <p>CO3: Problem 3 in mid-term exam (5%) and Assignment 3 (5 %) - 10%</p> <p>CO4: Problem 2, 3, and</p>
Reading List	<p>W1:Bhyuan, M., 2010, Intelligent Instrumentation Principles and Application, CRC Press, London, New York</p> <p>W2:Tianbiao Zhang, 2012, <i>Advances in Intelligence and Soft Computing</i>, Springer.</p> <p>W3:Mukhopadhyay, S.C, 2013, Intelligent Sensing, Instrumentation, and Measurement, Springer, New York</p> <p>W4 :Leung, H. and Mukhopadhyay, S.C, 2015, Intelligent Environmental Sensing, Springer, New York.</p>