

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

Module name	<b>Introduction to Instrumentation</b>	
Module level	Undergraduate	
Code	MII-1810	
Courses (if applicable)	<b>Industrial Instrumentation</b>	
Semester	Even (Genap)	
Contact person	Lukman Awaludin, S.Si., M.Cs.	
Lecturer	Dr. Danang Lelono, M.T. M. Idham Ananta Timur S.T., M.Kom. Lukman Awaludin, S.Si., M.Cs.	
Language	Bahasa Indonesia	
Relation to curriculum	Undergraduate degree program, elective, 2 <sup>nd</sup> semester	
Type of teaching, contact hours	Lectures, < 90 students, 180 minutes	
Workload	<ol style="list-style-type: none"> <li>1. Lectures: 3 x 50 = 150 minutes (2,5 hours) per week.</li> <li>2. Exercises and Assignments: 3 x 50 = 150 minutes (2,5 hours) per week.</li> <li>3. Private study: 3 x 60 = 180 minutes (3 hours) per week.</li> </ol>	
Credit points	3 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	<p>After completing this module, a student is expected to:</p> <p>CO-1 Understand the basic concept of instrumentation, recognize the control system in an instrumentation, and the characteristics of the instrumentation. Students understand also the basic concepts of electronics and electricity in the instrumentation system</p> <p>CO-2 Understand the types of instrumentation such as pressure instrumentation, level, flow, temperature/heat, density, viscosity, and pH. Besides, students understand the concept of instrumentation that uses other sensors such as position and motion; force; torque and load cells; smoke and chemical; sound and light</p> <p>CO-3 Understand the concepts of actuators and controls on instrumentation and processes in the industry</p> <p>CO-4 Able to understand and design electronic circuits related to each instrumentation</p> <p>CO-5 Able to analyze the needs of sensors and transducers associated with instrumentation</p>	<p>PLO2</p> <p>PLO2</p> <p>PLO2</p> <p>PLO3</p> <p>PLO4</p>

	CO-6 Able to make simulations / designs of an instrumentation system	
Content	<p>Instrumentation is a long-standing science. The instrumentation itself is equipment that is used and at the same time for measurement. For example, the equipment used to make fire, and Stonehenge used to observe the sun and stars. Until now this science has evolved into all fields, especially developing rapidly in the industrial world which has a very complex system. Even the instruments involved are sophisticated and sophisticated. All of them are microprocessor-based and can measure parameters that were impossible to do in previous years.</p> <p>On the other hand, this instrumentation is a comprehensive scope of knowledge so that the boundaries are discussed so that they focus on the science discussed and do not widen in a direction that is aimless.</p> <p>For this reason, the introduction of this instrumentation is focused on instruments that are widely applied to the industrial world. The discussion of instruments contained in the industrial world ranging from temperature, flow, and pressure on time and distance. This includes measurement methods, results in the form of higher accuracy, quality, accuracy and better performance. In this course, students will be given an overview of the basic concepts of instrumentation and its application, especially in an industry</p>	
Study and examination requirements and forms of examination	<ul style="list-style-type: none"> <li>• Task (Quizzes/Summary/Case Study) (6)</li> <li>• Assignments (2)</li> <li>• Mid-term examination</li> <li>• Final examination</li> </ul>	
Media employed	LCD, whiteboard, websites (eLisa).	
Assessments and Evaluation	<p>CO-1 Midterm exam, task (total: 12,5%)</p> <p>CO-2 Midterm exam, final exam, task (total: 25%)</p> <p>CO-3 Final exam, task (total: 12,5%)</p> <p>CO-4 Midterm exam, task (total: 10%)</p> <p>CO-5 Task, final exam (total : 10%)</p> <p>CO-6 Task, Assignments, midterm exam, final exam (total: 30%)</p>	
Reading List	<p>Blackburn, J.A : 2001, Modern instrumentation for scientists and engineers, Springer-Verlag New York Inc. New York USA.</p> <p>William C. Dunn, Fundamentals of Industrial Instrumentation and Process Control, Newnes, 2005.</p> <p>R. Sinclair, Sensor and Transducers, Newnes, 2001.</p> <p>Tony R. Kuphaldt, Lessons In Industrial Instrumentation, www.Pacontrol.com, 2009</p>	