

## FI588 Intelligent Instrumentation

Module name:	Intelligent Instrumentation	
Module level, if applicable:	Undergraduate	
Code:	FI588	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	7 <sup>th</sup>	
Module coordinator:	Waslaluddin	
Lecturer(s):	Waslaluddin	
Language:	Bahasa Indonesia	
Classification within the curriculum:	Elective course	
Type of Teaching:	Contact hours per week during the semester	Class Size
<ol style="list-style-type: none"> <li>1. Lecture (conceptual, contextual, and problem-solving approaches through expository, discussions, presentation, and experiment).</li> <li>2. Structured activities (assignments based on conceptual, contextual, and problem-solving approaches)</li> <li>3. Self-study (reading literature and project)</li> </ol>	1 hours 40 minutes	20
Workload:	The total workload is 91 hours/5440 minutes (3.2 ECTS) per semester, consisting of 25 hour 20 minutes/1400 minutes lectures (0.82 ECTS), 28 hours/1680 minutes structured activities (0.98 ECTS) and 28 hours/1680 minutes self-study (0.98 ECTS) per week for 14 weeks, 11hour 54 minutes/714 minutes for two exams (0.42 ECTS).	
Credit points:	3.2 ECTS	
Pre-requisites course(s):	FI589 Microprocessor Application	
Course Learning Outcomes (CLO):	<p>After taking this course the students have ability to:</p> <p>CLO1. Describe microprocessor technology as a computational and controller based on artificial intelligence algorithms</p> <p>CLO2. Explain technology of microcontroller as the base instrument, sensor and control intelligent</p> <p>CLO3. Apply microprocessor technology as an artificial intelligence-based computing and control system</p> <p>CLO4. Apply microcontroller technology as the basis for artificial intelligence-based sensor and control instruments</p> <p>CLO5. Apply the technology of information to manipulate sensors</p>	

	<p>and control based on artificial intelligence</p> <p>CLO6. Analyse alternative sensor- actuator Technology solutions with artificial Intelligence-based microprocessors</p> <p>CLO7. Report the results of making sensor- actuator technology products with artificial intelligence-based microcontrollers</p>																				
Content:	<p>This course provides an understanding of factual, conceptual and procedural knowledge about the principles, concepts and techniques of Intelligence-Based Instrumentation and their implementation and can apply them to relevant physics problems. The material of this course includes (1) Intelligent systems, (2) Artificial Intelligence, (3) Intelligence-based instruments, (4) Fuzzy Logic Control Systems and their applications, (5) Artificial Neural Networks and their Applications, (6) Genetic Algorithms and their applications, (7) Ants algorithm and Applications (8) Hybrid System and Its Application</p>																				
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1"> <thead> <tr> <th>No</th> <th>CLO</th> <th>Assessment Object</th> <th>Assessment Techniques</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CLO1 – CLO6</td> <td>Subject specific competences: a. Individual assignments b. Exam - Mid exam - Final exam c. Experiment report d. Project report</td> <td>Written  Written Test Written Test  Written Written</td> <td>10 %  25% 25%  10% 20%</td> </tr> <tr> <td></td> <td>CLO7</td> <td>e. Presentation</td> <td>Performance</td> <td>10%</td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CLO	Assessment Object	Assessment Techniques	Weight	1	CLO1 – CLO6	Subject specific competences: a. Individual assignments b. Exam - Mid exam - Final exam c. Experiment report d. Project report	Written  Written Test Written Test  Written Written	10 %  25% 25%  10% 20%		CLO7	e. Presentation	Performance	10%	Total				100%
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Forms of media:	Board, LCD Projector, Laptop/Computer																				
Literature:	<ol style="list-style-type: none"> <li>D'Ascoli, Steven. (2022). <i>Artificial Intelligence and Deep Learning with Python Every Line of Code Explained for Readers New to AI and New to Python: Every Line of Code Explained for Readers New to AI and New to Python</i>. Kindle Edition. Amazon.</li> <li>Lam, H., Ling, S. H., Ling, S. S., &amp; Nguyen, H. T. (2012). <i>Computational Intelligence and Its Applications: Evolutionary Computation, Fuzzy Logic, Neural Network and Support Vector Machine Techniques</i>. World Scientific.</li> <li>Kuswandi, Son, (2007). <i>Intelligent Control Theory and Its Practical Application</i>, Andi Yogyakarta</li> <li>Waslaluiddin. (2016). <i>Guidelines Practical Uses Minimum System Microcontroller for Intelligence Artificial</i>, not published</li> </ol>																				

**PLO and CLO mapping**

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1			√									
CLO2				√								
CLO3					√							
CLO4					√							
CLO5					√							
CLO6					√							
CLO7					√							