

FI364 Metrology and Calibration

Module name:	Metrology and Calibration	
Module level, if applicable:	Undergraduate	
Code:	FI364	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	5 th	
Module coordinator:	Ahmad Aminudin	
Lecturer(s):	Ahmad Aminudin	
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">1. Lecture (conceptual, contextual and problem-solving approaches through expository, discussions and practical methods).2. Structured activities (assignments based on conceptual, contextual and problem-solving approaches)3. Self-study (Practical/project)	2 hour 30 minutes	20
Workload:	The total workload is 136 hours/8160 minutes (4.8 ECTS) per semester, consisting of 35 hours/2100 minutes lectures (1.24 ECTS), 42 hours/2520 minutes structured activities (1.48 ECTS) and 42 hours/2520 minutes self-study (1.71 ECTS) per week for 14 weeks, 17 hours/1020 minutes for two exams (0.6 ECTS).	
Credit points:	4.8 ECTS	
Pre-requisites course(s):	FI241 Analog Electronics, FI441 Digital Electronics	

<p>Course Learning Outcomes (CLO):</p>	<p>After taking this course the students have ability to:</p> <p>CLO1. Describe the principles measurement and error CLO2. Describe measurement standard and calibrations CLO3. Apply direct current and alternating current indicator instruments CLO4. Describe the principles of potentiometer in measuring instruments CLO5. Apply potentiometer in measuring instrument CLO6. Describe the workings of direct current, alternating current CLO7. Apply direct current bridge, alternating current in measuring instrument. CLO8. Describe the working of oscilloscopes, multimeter, wave generators, and electronic counters CLO9. Utilize oscilloscope, multimeter, wave generator, electronic counter CLO10. Describe the working principle of sensor and transducer the instrumentation system CLO11. Analyse the use of measurement reliability</p>																				
<p>Content:</p>	<p>In this course, students will study Introduction, Measurements and Errors, Measurement and Calibration Standards, Direct current indicating instruments, Instruments for Indicating Alternating Current, Principles and usage of potentiometer, Direct current bridges and their applications: Wheatstone bridges, Kelvin bridges, Wheatstone bridges with safety, Wheatstone bridge applications in heat and light detection, Alternating current bridges and their applications: General forms of alternating current bridges, comparison bridges, Maxwell bridges, Hay, Schering, Unbalanced conditions, Wien bridges, magnetic grounding devices, Bridge applications in AC measurement; (ix) Oscilloscope, Multimeters, Waveform generation and analysis: Oscillator circuits, pulse and square generators, signal generators, function generators, wave analyzers, harmonic distortion analysers, spectrum analysers; Electronic counter and its applications, Instrumentation system input element transducers: Transducer positioning in instruments, Transducer grouping, transducer selection, Transducer applications in measurement, Reliability Measuring instruments</p>																				
<p>Study/exam achievements:</p>	<p>The final mark will be weight as follow:</p> <table border="1" data-bbox="667 1496 1471 2016"> <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 – CLO11</td> <td>Subject specific competences: a. Individual assignments b. Exam - Mid exam - Final exam</td> <td>Written Written test Written test</td> <td>20 % 25% 25%</td> </tr> <tr> <td>2</td> <td>CLO3, CLO5, CLO7, CLO8, CLO9, CLO11</td> <td>Subject specific competences: - Class Activity - Project</td> <td>Performance Performance</td> <td>10% 20%</td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CLO	Assessment Object	Assessment Techniques	Weight	1	CLO1 – CLO11	Subject specific competences: a. Individual assignments b. Exam - Mid exam - Final exam	Written Written test Written test	20 % 25% 25%	2	CLO3, CLO5, CLO7, CLO8, CLO9, CLO11	Subject specific competences: - Class Activity - Project	Performance Performance	10% 20%	Total				100%
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