



National Institute of Technology Meghalaya
An Institute of National Importance

CURRICULUM

Programme	Master of Technology in Mechanical Engineering	Year of Regulation					2018		
Department	Mechanical Engineering	Semester					I		
Course Code	Course Name	Credit Structure					Marks Distribution		
		L	T	P	C	INT	MID	END	Total
ME 561	Fluids and Thermal System Properties Measurement Lab	0	0	2	1	100	--	--	100
Course Objectives	To develop the student's ability to perform the experiments using various flow measuring instruments	Course Outcomes	CO1	Able to calibrate the various flow measuring devices and to measure the fluid flow rate with various flow measuring sensors such as venturimeter, orifice, rotameter, flow nozzle etc.					
	To develop the student's ability to calibrate and to perform experiments using temperature sensors.		CO2	Able to calibrate the temperature sensors and to study various temperature measuring instruments like mercury-in-glass thermometer, different types of thermocouples and RTDs					
	To develop the student's ability to perform the experiments with the help of LVDT, strain gauge and pressure transducer.		CO3	Able to carry out statistical and graphical representation of the experimental data recorded by data acquisition system and to analyse velocity profile with a Pitot tube for flow over a flat plate					
			CO4	Able to perform experiments using LVDT and electric resistance strain gauge					
			CO5	Able to measure static/dynamic pressure of fluid in pipe using pressure transducer.					

SYLLABUS

No.	Content	Hours	COs
I	To measure fluid flowrates with various flow measuring sensors like venturimeter, orifice, rotameter, flow nozzle, Pitot tube and turbine flowmeter and categorically compare them with respect to operating range, accuracy, characteristics, advantages and limitations.	04	CO1
II	To calibrate the various flow-measurement devices with basic methods and identify the primary causes of error in their measurement.	02	CO1
III	To study various temperature measuring instruments like mercury-in-glass thermometer, different types of thermocouples and RTDs, estimate their response times and compare them with respect to operating range, accuracy, characteristics, advantages and limitations.	04	CO2
IV	To calibrate the temperature sensors like mercury-in-glass thermometer, different types of thermocouples and RTDs using different methods and find the major cause of error in their measurement.	02	CO2
V	To measure the global solar radiation with a pyranometer and also the diffuse solar radiation by mounting the pyrano meter at the centre of semicircular shading ring arrangement.	02	CO2
VI	To carryout statistical analysis, graphical representation of the experimental data recorded by data acquisition system from the various flow/temperature/radiation measurements and estimate the errors/uncertainties using different techniques.	02	CO3
VII	To measure and analyze velocity profile with a Pitot tube for flow over a flat plate and demonstrate the boundary layer growth.	02	CO3
VIII	To study a linear variable differential transformer (LVDT), carryout small displacement measurements using it and also to calibrate the instrument.	02	CO4
IX	To determine stress and strain at prescribed conditions of a cantilever and a simply supported beam using electric resistance strain gauge.	02	CO4
X	To measure static/dynamic pressure of fluid in pipe using pressure transducer and to calibrate the device.	02	CO5
Total Hours		24	

Essential Readings

1. J. P. Holman, "Experimental methods for Engineers", McGraw-Hill, 6th edition 1994.
2. R. S. Sirohi and H. C. Radha Krishna, "Mechanical Measurements", Wiley, 2nd edition 1983.

Supplementary Readings

1. D. Dornfeld and D. Lee, "Precision Manufacturing", Springer, 2008.
2. T. Beckwith and L. Buck, "Mechanical Measurements", Narosa Publishing House, 6th edition 2006.