

**INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI**  
**PROFORMA FOR NEW COURSE**

1.	Title of the Course	Measurements in Thermal Engineering
2.	Course Number	ME5022
3.	Status of the Course	Elective
4.	Structure of Credits	2-0-2-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Dr.Anil Kumar E & Dr. Madan Mohan A
8.	To take effect from	July 2018
9.	Prerequisite	
10.	Whether approved by the Department	No
11.	<b>Course Objective:</b> At the end of the course Student will be able to Understand different measurement techniques for primary quantities and derived quantities, Estimate of uncertainty in measurements, Analyse experimental data statistically	
12.	<b>Course Content:</b> Introduction to measurements.Measurement categories-primary and derived quantities, intrusive and non-intrusive methods;Analysis of experimental data-types of errors, uncertainty analysis, propagation of uncertainty; Statistical analysis of experimental data- normal error distributions (confidence interval and level of significance, Chauvenet's criterion), Chi-square test of goodness of fit, method of least squares (regression analysis, correlation coefficient), multivariable regression, Students' t-distribution, graphical analysis and curve fitting. Static and dynamic characteristics; System response- first and second order systems and analysis, Measurement of temperature- thermoelectric thermometry, resistance thermometry, pyrometry, liquid in glass, bimetallic and liquid crystal thermometer, temperature sensors for measurement of transient temperature; Measurement of pressure-U-tube manometer, Bourdon gage, pressure transducers, measurement of transient and vacuum pressures. Measurement of volume flow rate- variable area type flow meter-orifice plate meter, flow nozzle, venture meter, rotameter. Measurement of velocity-Pitot static and impact probes, velocity measurement based on thermal effect, Doppler velocimetry, Time of flight velocimetry	
13.	Text book(s): 1. Venkateshan S.P., <i>Mechanical Measurements</i> , Anne Books Pvt. Ltd, (2015). 2. Holman J. P., <i>Experimental Methods for Engineers</i> , McGraw-Hill , (2011).	
14.	Reference(s): 1. Taylor J.R., <i>An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements</i> , University Science Books , (1997). 2. Doebelin, <i>Measurement System</i> , Tata McGraw-Hill Education , (1984). 3. Beckwith, <i>Mechanical Measurements</i> , Pearson Education India , (2007).	