

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Material Characterization Techniques
2.	Course Number	ME5208
3.	Status of the Course	Core
4.	Structure of Credits	2-0-2-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Mechanical Engineering
8.	To take effect from	January 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: To introduce different material characterization techniques and make students familiar with the underlying principles. To provide practical experience in laboratory methods. To provide basic descriptions of a range of common characterization methods for the determination of the structure of solids.	
12.	Course Content: Introduction: Requirement of different techniques of material characterization for different situations; Mechanical and physical characterization. Optical Metallographic Techniques: Preparation of samples, Observation of microstructure. Mechanical Characterization Processes: Measurement of hardness, fracture, toughness, adhesion, ductility, creep, strength. Surface profilometry; Tribological studies of materials. Physical Characterization Processes: Introduction to different methods and their applications; Diffraction methods for phase; residual stresses; texture analysis etc. Electro-optical and related techniques like SEM, TEM, EDS, WDS/EPMA etc. Surface analysis and related techniques like XPS, AFM etc. Spectroscopic techniques.	
13.	Text book(s): 1. C. R. Brundle, C. A. Evans, S. Wilson, <i>Encyclopedia of materials characterization: surfaces, interfaces, thin films, Material characterization series, surfaces, interfaces, thin films</i> , Butterworth-Heinemann, (1992).	
14.	Reference(s): 1. P. J. Goodhew, J. Humphreys, R. Beanland, <i>Electron Microscopy and Analysis</i> , Taylor and Francis, (2000).	