

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE			
Course Title	Metallography, Materials Testing and Characterization Laboratory		
Course Code	MT 659	No. of Credits	2
Department	MME	Faculty	Dr S KUMARAN Dr P VENKATACHALAM
Pre-requisites Course Code	Not applicable		
Course Coordinator(s) (if, applicable)	Dr S KUMARAN		
Other Course Teacher(s)/Tutor(s) E-mail	--	Telephone No.	9944434705 Intercom : 3482
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		

COURSE OVERVIEW

1. Study of metallurgical microscope and sample preparation
2. Microscopic examination of ferrous alloys (plain carbon steels, stainless steels, maraging steels and tool steels and cast irons).
3. Microscopic examination of non-ferrous materials (Magnesium alloys, Aluminium alloys, Titanium alloys, Copper alloys, Super alloys).
4. Tensile Testing using Hounsfield and UTM.
5. Hardness Measurements (Rockwell, Vickers and Brinell).
6. Impact Testing (Izod and Charpy).
7. Determination of crystal structure, crystal size and lattice parameters of materials from XRD data.
8. Fractography using scanning electron microscope (Demonstration).
9. Repetition.
10. Viva Voce & Final Assessment.

COURSE OBJECTIVES

To learn the principles of material testing and characterization and to apply them for various engineering applications.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Prepare the specimens for metallographic examination with best practice, can operate the optical microscope and understand, interpret, analyze the microstructure of materials.	1,2
2. Classify the different mechanical testing methods with their inherent merits and limitations.	1,2
3. Apply various test methods for characterizing physical properties of materials.	3,4,5
4. Recommend materials testing techniques based upon desired results, perform basic statistical analysis on data, and summarily present test results in a concise written format.	2,3,5

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	August	Fundamentals metallurgical microscope and sample preparation.	Practical and Demonstraion
2	August-September	Microscopic examination of ferrous and non-ferrous alloys.	
3	September-October	Testing of Materials (Tensile, Hardness and Impact).	
4	October-November	XRD Analysis of materials & fractography using SEM.	

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration (min.)	% Weightage
1	Continuous assessment	September-November	2hrs/assessment	50
2	Record	September-November	10	20
3	Viva Voce	November	10min/student	10
4	Final assessment	November	2hrs	20

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc.,

1. Avner, S. H., "Introduction to Physical Metallurgy", second edition, McGraw Hill, 1985.
2. William F. Hosford, Physical Metallurgy, Taylor & Francis Group, 2008
3. Vijendra Singh, Physical Metallurgy, Standard Publishers.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

Student's feedback

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

Min. attendance is 75%. Students with less than 75% attendance will be prevented for writing final assessment. She /He can undergo re-do or formative assessment as per Instt. norms. Grading is as per Institute norms.

ADDITIONAL COURSE INFORMATION

You are welcomed for technical discussion out of the class room. Please contact me through my email (kumara@nitt.edu) id or mobile (9944434705)

FOR SENATE'S CONSIDERATION

 Course Faculty  CC-Chairperson  HOD