

SCHEME OF COURSE WORK

Course Details:

Course Title	: Material Science and Engineering Lab		
Course Code	: 22ME1102	L T P C	: 0 0 3 1.5
Program:	: B Tech		
Branch:	: Mechanical Engineering		
Semester	: II		

Course Outcomes (COs):

At the end of the course, the student will be able to

CO	Course Outcomes
CO1	Identify various microstructures of pure metals
CO2	Identify various microstructures of steels
CO3	Identify various microstructures of cast irons
CO4	Measure hardness of treated and untreated steels
CO5	Demonstrate hardenability of steels by Jominy End Quench Test

Program Outcomes (POs):

The undergraduate of mechanical engineering will be able to

PO 1	Apply the knowledge of mathematics, science, engineering fundamentals to solve complex mechanical engineering problems
PO 2	Attain the capability to identify, formulate and analyze problems related to mechanical engineering
PO 3	Design solutions for mechanical system components and processes that meet the specified needs with appropriate consideration for public health and safety
PO 4	Perform analysis, conduct experiments and interpret data by using research methods such as design of experiments to synthesize the information and to provide valid conclusions
PO 5	Select and apply appropriate techniques from the available resources and current mechanical engineering and software tools
PO 6	Carry out their professional practice in mechanical engineering by appropriately considering and weighing the issues related to society
PO 7	Understand the impact of the professional engineering solutions on environmental safety and legal issues

PO 8	Transform into responsible citizens by resorting to professional ethics and norms of the engineering practice
PO 9	Function effectively in individual capacity as well as a member in diverse teams and in multidisciplinary streams
PO10	Communicate fluently with the engineering community and society, and will be able to prepare reports and make presentations effectively
PO11	Apply knowledge of the engineering and management principles to managing projects and finance in multidisciplinary environments
PO12	Engage themselves in independent and life-long learning to continuing professional practice in their specialized areas of mechanical engineering

Course Outcome versus Program Outcomes:

Assessment Methods:				Observation/ Record / Internal Exam / End Exam								
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				3	2				1			2
CO2				3	2				1			2
CO3				3	2				1			2
CO4				3	2				1			2
CO5				3	2				1			2

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), put -: No correlation

Program Specific Objectives

PSO1	Design, analyze and optimize mechanical systems along with control mechanisms
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PSO2	Manufacture mechanical components by selecting effective processing methods and efficient tools
PSO3	Design, analyze and evaluate thermal systems

Course Outcomes Versus Program Specific Outcomes

Cos	PSO1	PSO2	PSO3
CO1	2	3	
CO2	2	3	
CO3	2	3	
CO4	2	3	
CO5	2	3	

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), put -: No correlation

Teaching-Learning and Evaluation

Week	Contents	Course Outcomes	Sample Questions	Teaching Learning Strategy	Assessment Method & Schedule
1.	Study of metallurgical microscope				
2.	Preparation of specimen for metallographic observation				
3.	Study of microstructure of Copper	CO - 1	What is the density of copper at room temperature?	Experiment	Internal Lab 1 Observation Record Submission
4.	Study of microstructure of Aluminium	CO - 1	Give some applications of Aluminium.	Experiment	Internal Lab 1 Observation Record Submission
5.	Study of microstructure of low carbon steels	CO - 2	What is the carbon content in low carbon steel?	Experiment	Internal Lab 1 Observation Record Submission

6.	Study of microstructure of medium carbon steels	CO - 2	What are the effect of Sulphur and phosphorus on the properties of steels?	Experiment	Internal Lab 1 Observation Record Submission
7.	Study of microstructure of high carbon steels	CO - 2	Differentiate among low, medium and high carbon steels?	Experiment	Internal Lab 1 Observation Record Submission
8.	INTERNAL EXAM- 1				
9.	Study of microstructure of White cast iron	CO - 3	What are the applications of White Cast Iron?	Experiment	Internal Lab 2 Observation Record Submission

10.	Study of microstructure of Malleable cast iron	CO - 3	What is the effect of Si content on the properties of Cast irons ?	Experiment	Internal Lab 2 Observation Record Submission
11.	Study of microstructure of Grey cast iron	CO - 3	What is the effect of rate of cooling on the microstructure of gray cast iron?	Experiment	Internal Lab 2 Observation Record Submission
12.	Study of microstructure of S G cast iron	CO - 3	How does nodular cast iron is obtained?	Experiment	Internal Lab 2 Observation Record Submission
13.	Study of microstructure of aluminum alloy	CO - 3	What are the applications of Dura aluminim ?	Experiment	Internal Lab 2 Observation Record Submission

14.	Study of microstructure of copper alloy	CO - 3	What are the applications of Admiralty brass and Muntz metal?	Experiment	Internal Lab 2 Observation Record Submission
15.	Study of microstructure of heat treated steels.	CO - 4	What are the basic types of heat treatments?	Experiment	Internal Lab 2 Observation Record Submission
16.	Finding the hardness of various untreated and treated steels.	CO - 4	What are the hardness testing methods?	Experiment	Internal Lab 2 Observation Record Submission
17.	Determine the hardenability of steels by Jominy End Quench Test.	CO - 5	Define the term Hardenability	Experiment	Internal Lab 2 Observation Record Submission
18.	Internal Exam – 2				
19.	External Lab Exam				