



# IIPM SCHOOL OF ENGINEERING AND TECHNOLOGY

## LESSON PLAN: 2023-24

**Sub: ENGINEERING MATERIAL**

**Faculty name : Prasanna Mohanty**

**Branch : Mechanical Engineering**

**Semester : 3<sup>rd</sup>**

**Duration : 60 hours**

**Objective :** This subject useful for detailed study of

- Realizing material requirements
- Realizing application area of ferrous, non ferrous and alloys
- Comprehending micro-structural changes during iron-carbon phase transformation process
- Comprehending effect of heat treatment and its effect towards change in material properties
- Comprehending continuity during evolution in engineering materials and development of modern engineering materials.

Learning Outcome:

Entire field of engineering deals with use of host of materials for making objects for human need. These materials include wide spectrum of element, metals, alloys and compounds with diverse properties. It is imperative that an engineer from any field should have a good knowledge of such materials and their properties.

Sl.No	Chapter	Proposed Week for Teaching	Lecture No.	Sub. Topic	Important Teaching Points	Content Source
1	I	1	1	Introduction	Basic fundamental classes	O P Khanna
2			2	Engineering materials and their properties	their mechanical and physical properties	O P Khanna
3			3	Different mechanical engineering materials	their mechanical and physical properties	O P Khanna

4			4	Material classification	ferrous and non ferrous category and alloys	O P Khanna
5	I	2	1	Properties of Materials:	Physical , Chemical and Mechanical	O P Khanna
6			2	Cont.	Cont.	O P Khanna
7			3	Performance requirements	General consideration	O P Khanna
8			4	Material reliability and safety	Material reliability and safety	O P Khanna
9	II	3	1	Ferrous Materials and alloys	Introduction	O P Khanna
10			2	Characteristics and application of ferrous materials	do	O P Khanna
11			3	Classification, composition and application	low carbon steel, medium carbon steel and High carbon steel	O P Khanna
12			4	Cont..	Cont..	O P Khanna
13	II	4	1	Alloy steel	Low alloy steel, high alloy steel	O P Khanna
			2	Alloy steel	tool steel and stainless steel	O P Khanna
14			3	Tool steel:	Effect of various alloying elements	O P Khanna

15			4	Tool Steel	Cr, Mn, Ni, V, Mo,	O P Khanna
16	III	5	1	Iron – Carbon system	Introduction	O P Khanna
17			2	Cont..	Solved Previous year question	O P Khanna
18			3	Concept of phase diagram	Different types of phases	O P Khanna
19			4	cooling curves	Liquidous, Solidous	O P Khanna
20	III	6	1	Features of Iron-Carbon diagram	Pictorial Representation	O P Khanna
21			2	Features of Iron-Carbon diagram	-do-	O P Khanna
22			3	Features of Iron-Carbon diagram	Cont.	O P Khanna
23			4	Features of Iron-Carbon diagram	salient micro-constituents of Iron and Steel	O P Khanna
24	IV		1	Crystal imperfections	introduction	O P Khanna
25			2	Crystal defines, classification of crystals	ideal crystal and crystal imperfections	O P Khanna
26			3	Cont...	Cont...	O P Khanna
27			4	Classification of imperfection	Point defects, line defects,	O P Khanna
28	IV		1	Classification of imperfection	surface defects and volume defects	O P Khanna
29			2	Types and causes of point defects:	Vacancies, Interstitials and impurities	O P Khanna

30	& IV	7	3	Types and causes of line defect	Edge dislocation and screw dislocation	O P Khanna
31			4	Types and causes of line defect	Edge dislocation and screw dislocation	O P Khanna
32	IV	8	1	Effect of imperfection on material properties	Problems on above.	O P Khanna
33			2	Cont..	Cont..	O P Khanna
34			3	Previous year question	Previous year question	O P Khanna
35			4	Deformation	by slip and twinning	O P Khanna
36	V	9	1	Heat Treatment	Introduction	O P Khanna
37			2	Heat Treatment	Use & need	O P Khanna
38			3	Purpose of Heat treatment	Purpose of Heat treatment	O P Khanna
39			4	Process of heat treatment	Annealing, normalizing	O P Khanna
40	V	10	1	Process of heat treatment	hardening, tempering	O P Khanna
41			2	Process of heat treatment	, stress relieving measures	O P Khanna
42			3	Cont.	Cont.	O P Khanna

43			4	Surface hardening	Carburizing and Nitriding	O P Khanna
44	V	11	1	Effect of heat treatment	on properties of steel.	O P Khanna
45			2	Hardenability of steel	Hardenability of steel	O P Khanna
46			3	Hardenability of steel	Hardenability of steel.	O P Khanna
47			4	Non-ferrous alloys	Aluminum alloys	O P Khanna
48			VI	12	1	Composition, property and usage of Duralmin, y-alloy:
49	2	Cont..			Cont..	O P Khanna
50	3	Copper alloys:			Composition , property and usage of CopperAluminum	O P Khanna
51	4	Copper alloys			Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nic	O P Khanna
52	VII	13			1	Predominating elements of lead alloys,
53			2	Bearing Material	Classification, composition, properties	O P Khanna
54			3	Bearing Material	uses of Copper base, Tin Base,	O P Khanna
55			4	Bearing Material	Lead base, Cadmium base bearing materials	O P Khanna

56	VIII & IX ,X	14	1	Spring materials	Classification, composition, properties	O P Khanna
57			2	Polymers	Thermosetting and thermoplastic polymers	O P Khanna
58			3	Composites and Ceramics	Classification, composition	O P Khanna
59			4	Composites and Ceramics	uses of ceramics	O P Khanna

**Text book suggested : O P Khanna & PERSONAL NOTES**

Signature of

Faculty Member

HOD

Principal/ Director