



Department of Mechanical Engineering
Raajdhani Engineering College, Bhubaneswar, Odisha-751017
LESSON PLAN

Faculty Name	DEBASISH MOHAPATRA			Name of the Program	Diploma in Mechanical Engineering
Course Name	ENGG .MATERIAL			Course Code/college code	[Th-1]/C201
Course Year	2 nd year	Semester	3 rd	Academic Period	2023-24
No. of Classes allotted per Week	4		Planned Classes Required to Complete the Course		60

Sl. No.	Topics to be covered	Module	No. of hours Required	Mode of Teaching	CO	BOOK	CHAPTER (PAGES)	OTHER SOURCE(IM)
1	Material classification into ferrous and non-ferrous category and alloys	1	1	LM/ IM	CO1	T1	T1-2-1 to2-4	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=KX1_NqNTIqw&list=PLjk-OqI4WmPLouP4pNzFV4aOawQbNwNPi
2	Properties of Materials: Physical , Chemical and Mechanical	1	1	LM/ IM	CO2	T1	T1-3-1to 3-9	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=ZbbsFnu-KA
3	Performance requirements	1	1	LM/ IM	CO1	T1	T1-4-1to4-2 T2-	(A text book of material science and metallurgy by O P Khanna)
4	Material reliability and safety	1	1	LM/ IM	CO1	T1	T1-4-1 to 4-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=m0W8nnu-pcUk
5	QUESTION DISCUSSION	1	1	LM/ IM	CO1	T1		(A text book of material science and metallurgy by O P Khanna)
6	Application of ferrous material	1	1	LM/ IM	CO1	T1	T1-5-1	(A text book of material science



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								and metallurgy by O P Khanna) https://www.youtube.com/watch?v=iz5wg9Ob1gg
7	Classification, composition and application of low carbon steel, medium carbon steel and Highcarbon steel	1	1	LM/ IM	CO1	T1	T1-5-13 to 5-14	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=1rzJsaKcmE
8	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel	1	1	LM/ IM	CO1	T1	T1-5-15,5-39	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=xaPOjaYofv
9	. Tool steel: Effect of various alloying elementssuch as Cr, Mn, Ni, V, Mo	1	1	LM/ IM	CO1	T1	T1-5-17,18	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=h8jLICWspWE&t=2s
10	Recap/Summarize	1	1	LM/ IM	CO2	T1		(A text book of material science and metallurgy by O P Khanna)
11	. Concept of phase diagram	2	1	LM/ IM	CO2	T1	T1-39-1,39-5	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=BJrTZ07bHm4&list=PLfIFNJ1DPG4IENg4VUTWyKxxB911aHuJz
12	. Concept of cooling curves	2	1	LM/ IM	CO2	T1	T1-39-4	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=OuqtNX4oR7w
13	. Iron-Carbon diagram	2	1	LM/ IM	CO2	T1	T1-40-1,40-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=z5gnDGXm8U4
14	Iron-Carbon diagram	2	1	LM/ IM	CO2	T1	T1-40-1,40-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=z5gnDGXm8U4



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15	reaction involved in iron-carbon diagram	2	1	LM/ IM	CO2	T1	T1-39-16 to 39-20	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=FJenDrhiUIE
16	. Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	2	1	LM/ IM	CO2	T1	T1-40-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=FJenDrhiUIE
17	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	2	1	LM/ IM	CO2	T1	T1-40-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=FJenDrhiUIE
18	Assignment Evaluation/ Review class	2	1	LM/ IM	CO2	T1		(A text book of material science and metallurgy by O P Khanna)
19	Crystal imperfections: Crystal defines, classification of crystals, ideal crystal and crystal imperfections	3	1	LM/ IM	CO3	T1	T1-37-1	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=0wYzKBk-OVI
20	Classification of imperfection, Point defects, line defects	3	1	LM/ IM	CO3	T1	T1-37-1 to 37-5, 37-5 to 37-9	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=RnG1jn5tnM
21	surface defects and volume defects	3	1	LM/ IM	CO3	T1	T1-37-10, 37-12	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=aRBf9rKGpes
22	Types and causes of point defects: Vacancies, Interstitials and impurities, Types and causes of line defects	3	1	LM/ IM	CO3	T1	T1-37-6	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=UIp8dEoCH3g , https://www.youtube.com/watch?v=aHp2xhFFZqU ,
23	Effect of imperfection on material properties Edge dislocation and screw dislocation	3	1	LM/ IM	CO3	T1	T1-37-12, 37-13, 37-8	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=tR77YoVgSxY



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24	Edge dislocation and screw dislocation Deformation by slip and twinning	3	1	LM/ IM	CO3	T1	T1-37-10,37-11	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/shorts/5no1K0P01qI , https://www.youtube.com/watch?v=tR77YoVgSxY
25	Effect of deformation on material properties	3	1	LM/ IM	CO3	T1	T1-37-12	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=UJL1zpYnt1s
26	crystal structure of materials(extra)	3	1	LM/ IM	CO3	T1	T1-35-20 to 35-26	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=uv0LxMoalEQ
27	Recap/Summarize	3	1	LM/ IM	CO3	T1	T1-T2-	(A text book of material science and metallurgy by O P Khanna)
28	Heat Treatment, Purpose of Heat treatment	4	1	LM/ IM	CO4	T1	T1-43-1	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=-cyu6Ds0-ps
29	process of heat treatment	4	1	LM/ IM	CO4	T1	T1-43-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=CsFJGF3oCyc
30	annealing, normalizing	4	1	LM/ IM	CO4	T1	T1-43-3,43-7	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=-8OtTaCkV3c
31	hardening, tempering	4	1	LM/ IM	CO4	T1	T1-43-9,43-13	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=2LBA-2Wx0S0



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32	stress relieving measures	4	1	LM/ IM	CO4	T1	T1-T2-	(A text book of material science and metallurgy by O P Khanna)
33	. Surface hardening:Carburizing, Nitriding	4	1	LM/ IM	CO4	T1	T1-43-9	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=OiUQFjsM7Xs
34	Effect of heat treatment on properties of steel	4	1	LM/ IM	CO4	T1	T1-43-18,19,20	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=_jsXre6r7_A
35	Hardenability of steel	4	1	LM/ IM	CO4	T1	T1-43-22	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=sKq3but88Qw
36	INTERNAL	4	1	LM/ IM	CO4	T1	T1-T2-	(A text book of material science and metallurgy by O P Khanna)
37	INTERNAL	4	1	LM/ IM	CO4	T1	T1-T2-	(A text book of material science and metallurgy by O P Khanna)
38	INTERNAL	4	1	LM/ IM	CO4	T1	T1-T2-	(A text book of material science and metallurgy by O P Khanna)
39	. Non-ferrous alloys: Aluminum alloys:Composition, property and usage of duralmin	5	1	LM/ IM	CO5	T1	T1-6-1,6-8,9 T2-	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=wUE0d7dWY24
40	Aluminum alloys: Composition, property and usage of y- alloy	5	1	LM/ IM	CO5	T1	T1-6-10 T2-	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/shorts/oCM_106CAh8



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41	Copper alloys: Composition, property and usage of Copper-Aluminum	5	1	LM/ IM	CO5	T1	T1-6-2,6-3	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=i2UrKhINZFo
42	Composition, property and usage of Copper-Tin	5	1	LM/ IM	CO5	T1	T1-6-20	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/shorts/N5k0oHeHRg4
43	Babbit metal , Phosperous bronze, brass,Copper-Nickel	5	1	LM/ IM	CO5	T1	T1-6-2	(A text book of material science and metallurgy by O P Khanna)
44	Properties and usage of lead alloys, Zinc alloys and Nickel alloy	5	1	LM/ IM	CO5	T1	T1-6-16	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=-zB_KVQOLIQ
45	predominating elements of lead alloys	5	1	LM/ IM	CO5	T1	T1-6-14	(A text book of material science and metallurgy by O P Khanna)
46	Zinc alloys and nickel alloys	5	1	LM/ IM	CO5	T1	T1-6-16,17,18 with 11-1	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=N25CsdcTYWg
47	low alloy materials like p-91,p-92 for power plants and other high temp. services	5	1	LM/ IM	CO5	T1	T1-	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=bxYsPRyHndk
48	high alloys material like stainless steel grades of duplex, super duplex material etc.	5	1	LM/ IM	CO5	T1	T1-	(A text book of material science and metallurgy by O P Khanna)
49	Bearing Material: Classification, composition,properties and uses of Copper base, Tin Base bearing material	5	1	LM/ IM	CO5	T1	T1-9-1	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=g2qzhlqqFWY



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50	Bearing Material: Classification, composition, properties and uses of Copper base, Tin Base bearing material	5	1	LM/ IM	CO5	T1	T1-9-1	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=yboNjq4JcB
51	Bearing Material: Classification, composition, properties and uses of lead base base, cadmium Base bearing material	5	1	LM/ IM	CO5	T1	T1-9-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=yboNjq4JcBI
52	Spring materials: Classification, composition, properties and uses of Iron-base spring materials	5	1	LM/ IM	CO5	T1	T1-10-1to10-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=pgYkkSE7hs8&list=PL4K9r9dYCOopj1vhL3ho8W39vJNPoQ-cQ
53	Spring materials: Classification, composition, properties and uses of copper base spring material.	5	1	LM/ IM	CO5	T1	T1-10-2 to 10-4	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=pgYkkSE7hs8&list=PL4K9r9dYCOopj1vhL3ho8W39vJNPoQ-cQ
54	SURPRIZE TEST	6	1	LM/ IM	CO5	T1	T1-T2-	(A text book of material science and metallurgy by O P Khanna)
55	Polymers: Properties and application of thermosetting and thermoplastic polymers	6	1	LM/ IM	CO6	T1	T1-22-1,22-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=U7tTD3Hdx2A&list=PLiYAH68F-CTDvXZ2G5JICP91oxb1WX1d
56	Thermosetting and thermoplastic polymer	6	1	LM/ IM	CO6	T1	T1-22-5,22-8	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=l-xOrkLb-Rk
57	Properties of elastomers	6	1	LM/ IM	CO6	T1	T1-22-2	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=3W2MkMp9Kuc



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58	. Classification, composition, Properties and uses of particulated based and fiber reinforced composites.	6	1	LM/ IM	CO6	T1	T1-23-1 to 23-4	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=0vv2_0CeAU
59	Classification and uses of ceramics	6	1	LM/ IM	CO6	T1	T1-16-1	(A text book of material science and metallurgy by O P Khanna) https://www.youtube.com/watch?v=3LSsEtwaHzY
60	PREVIOUS YEAR QUESTION	6	1	LM/ IM	CO6	T1		(A text book of material science and metallurgy by O P Khanna)

LM: Learner Mode: Chalk & Talk, Lecture **IM: Interactive Mode:** PPT, VIDEO and Animation
T1: A textbook of Material science and metallurgy by o.p.khanna

Signature of the Faculty

Signature of the HOD