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Narsapur, West Godavari District, A.P. 534280

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Code		S	emester	Branches	Contact Periods /Week	Academic Year	comm	ate of encement emester	
20ME3 02	3T Material Scie and Metallu		III	III Mechanical 5 2024-25 30-07		07-2024			
COUR	SE OUTCOMES								
COI	Describe the diff	erent m	etals crysta	al structure and p	hase diagra	m. [K2]			
CO2.	Illustrate various						[K3]		
CO3.	Explicate various								
CO4.	Summarize the d	To represent this co	DISTRICT - C. C.			(5)6		8	
	Demonstrate the					uring and A	nnlication	s [K2]	
CO5.								ar [rea]	
CO6.	Infer the concept			nposite materials				Dallar	
UNIT	Outcomes / Bloom's Level	Topics No.		Topics/Activity		Text Book Reference	Contact	Deliver	
			DE META	LS AND CONS					
		1.1	THE RESERVE OF THE PARTY OF THE	tion about Mate	rio1	Γ1, T2, R1	1	Chalk &	
		1.2	The state of the s	ization of metals	7	Γ1, T2, R2	1		
		1.3	Crystal	structure		Γ1, T2, R1	1		
		1.4	Grain, g	rain boundaries	5.0	Γ1, T2, R3	1		
		1.5	Imperfe	ctions and its typ	-	Γ1, T2, R1	1		
	CO1.	1.6		Twinning		Γ2, T1, R1	1		
I	Describe the different	1.7		ty of alloying & solutions	Types	Γ1, T2, R2	1		
•	metals crystal structure and	1.8	Interme	tothery's rules & diate alloy phase	s	Γ1, T2, R2	1	Talk, PPT,	
	phase diagram. [K2]	diagrams 1.10 Isomorphous alloy systems T2, T	Γ1, T2, R4	1	Active learning				
			T2, T1, R1	1					
		1.11	Equilibrate of alloy	rium cooling and	heating .	Γ1, T2, R2	1		
		1.12	state - a	rmations in the s dlotropy, eutectooid reactions	25/25/30		1		
		1.13		f binary phase di Cu-Ni and Fe-Fo			1		



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				TOTAL	13		
			FERROUS METALS AND	ALLOYS	-14		
		Structure and prop	Structure and properties of White cast iron and Malleable cast iron	T1, T2, R2	1		
	CO2. Illustrate	2.2	Grey cast iron and Spheroidal graphite cast iron Structure and properties	T2, T1, R1	1		
	various types	2.3	Classification of steels	T1, T2, R2	1		
П	of ferrous metals, their properties and applications. [K3]	2.4	Structure and properties of plain carbon steels & low alloy steels	T1, T2, R1	1	Chalk & Talk PPT, Videos	
		2.5	Structure and properties of Hadfield manganese steels	T1, T2, R1	1		
		2.6	Structure and properties of tool and die steels	T1, T2, R1	1		
		NON-FERROUS METALS AND ALLOYS					
		2.7	Structure and properties of Copper and Aluminium its alloys	T1, T2, R2	1		
		Structure a	Structure and properties of Titanium and its alloys	T1, T2, R2	1		
		2.9	Magnesium and Super alloys Structure and properties	T1, T2, R2	1		
CBS			Tungsten carbides	Internet	1		
				TOTAL	10		
			HEAT TREATMENT OF STEEL	S			
	There seems to	200.000	Effect of alloying elements on	T1, T2, R2			
	CO3.Explicate	3.1	Fe-Fe3C system	****	1		
	various types of nonferrous	3.1	Fe-Fe3C system Heat Treatment and Annealing Process Types	T1, T2, R2	1		
	various types of nonferrous metals, their properties and		Heat Treatment and Annealing Process Types Normalizing and Hardening Process			Chall	
m	various types of nonferrous metals, their	3.2	Heat Treatment and Annealing Process Types Normalizing and Hardening	T1, T2, R2	1	— Chall & Tal — PPT.	
Ш	various types of nonferrous metals, their properties and applications. [K2]	3.2	Heat Treatment and Annealing Process Types Normalizing and Hardening Process Tempering and Hardenability	T1, T2, R2 T2, R1,R2	1	& Tal PPT	
Ш	various types of nonferrous metals, their properties and applications.	3.2 3.3 3.4	Heat Treatment and Annealing Process Types Normalizing and Hardening Process Tempering and Hardenability Process	T1, T2, R2 T2, R1,R2	1 1 1	& Tal PPT	
Ш	various types of nonferrous metals, their properties and applications. [K2] CO4. Summarize the different heat	3.2 3.3 3.4 3.5	Heat Treatment and Annealing Process Types Normalizing and Hardening Process Tempering and Hardenability Process TTT & CCT diagrams Surface Hardening and its	T1, T2, R2 T2, R1,R2 T1, T2, R1	1 1 1	& Tal PPT	
Ш	various types of nonferrous metals, their properties and applications. [K2] CO4. Summarize the	3.2 3.3 3.4 3.5 3.6	Heat Treatment and Annealing Process Types Normalizing and Hardening Process Tempering and Hardenability Process TTT & CCT diagrams Surface Hardening and its Methods	T1, T2, R2 T2, R1,R2 T1, T2, R1 T1, T2, R3	1 1 1 1	& Tal PPT	
III	various types of nonferrous metals, their properties and applications. [K2] CO4. Summarize the different heat treatment	3.2 3.3 3.4 3.5 3.6 3.7	Heat Treatment and Annealing Process Types Normalizing and Hardening Process Tempering and Hardenability Process TTT & CCT diagrams Surface Hardening and its Methods Age hardening treatment	T1, T2, R2 T2, R1,R2 T1, T2, R1 T1, T2, R3 T1, T2, R1	1 1 1 1	135 135 135 135 135 135 135 135 135 135	



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, l	4.1	Basic powder metallurgy processes	T1, T2, R2	1		
CO5.	4.2	Methods of producing metal powders	T2, T1, R1	1		
the metal powders producing Methods, Manufacturing and	the metal	4.3	Atomization and Chemical Reduction methods	T1, T2, R3	1	
	4.4	Electrolytic Deposition and Milling methods	T1, T2, R2	1	Chalk & Talk PPT, Videos PBL	
	4.5	Granulation Process	T1, T2, R1	1		
	4.6	Compacting and Sintering methods	T1, T2, R2	1		
[K2]	4.7	Powder Metallurgy Secondary operations	T12, T1,R1	1		
	4.8	Applications of powder metallurgical products	T1, T2, R1	1		
		Magnesium Metal Powder	T1, T2, R3	1	PPT Video	
			TOTAL	9		
	CER	AMIC AND ADVANCED MATE	RIALS			
	5.1	Ceramics and its types- glasses, cermets & abrasive materials	T2, T1, R2	1		
	5.2	Composites and its types	T1, T2, R2	1		
	5.3	Composite manufacturing methods	T1, T2, R1	1		
COS I C II	5.4	Particle and fiber reinforced composites	T2, T1, R2	1	Chalk & Tall	
concepts of	5.5	Metal Matrix Composite	T1, T2, R4	1	PPT Video	
composite	5.6	Ceramics Matrix Composite and Carbon – Carbon Composite	T2, T1, R2	1		
nano materials.	5.7	Introduction to Nano materials	T1, T2, R1	1		
	5.8	Smart materials.	T2, T1, R3	1	79.0	
			TOTAL	8		
		CUMULATIVE PROPOSEI	PERIODS	49		
ooks:			HER THE		911 15	
AUTHORS, BO	OK TI	TLE, EDITION, PUBLISHER, Y	EAR OF PUB	LICAT	ION	
V. Rahghavan	, Mate	rials Science and Engineering: A	First Course	6 th Ed	lition, Pl	
	Demonstrate the metal powders producing Methods, Manufacturing and Applications. [K2] CO6. Infer the concepts of ceramics, composite materials and nano materials. [K2] Ooks: AUTHORS, BO V. Rahghavan	Demonstrate the metal powders producing Methods, Manufacturing and Applications. [K2] CER. 5.1 5.2 5.3 CO6. Infer the concepts of ceramics, composite materials and nano materials. [K2] 5.6 materials and nano materials. [K2] 5.7 S.8 Ooks: AUTHORS, BOOK TI	Demonstrate the metal powders producing Methods, Manufacturing and Applications. [K2] 4.6 Granulation Process Compacting and Sintering methods Applications. [K2] 4.7 Powder Metallurgy Secondary operations Applications Magnesium Metal Powder CERAMIC AND ADVANCED MATE CERAMIC AND ADVANCED MATE Solutions Applications of powder metallurgical products Magnesium Metal Powder CERAMIC AND ADVANCED MATE Composite materials and its types glasses, cermets & abrasive materials 5.2 Composite and its types Composite manufacturing methods Particle and fiber reinforced composites CO6. Infer the concepts of ceramics, composite materials and nano materials. CO6. Infer the concepts of ceramics, composite materials and nano materials. CO6. Infer the concepts of ceramics, composite materials and nano materials. CO6. Infer the concepts of ceramics, composite materials and nano materials. CO6. Infer the concepts of ceramics, composite materials and nano materials. CO6. Infer the concepts of ceramics, composite materials and nano materials. CO6. Infer the concepts of ceramics, composite materials and mano materials. CO6. Infer the concepts of ceramics, composite materials and mano materials. CO6. Infer the concepts of ceramics, composite materials and mano materials. CO6. Infer the concepts of ceramics, composite materials and mano materials. Solution methods CO6. Infer the concepts of ceramics, composite manufacturing methods Introduction to Nano materials. CUMULATIVE PROPOSEI Ooks: AUTHORS, BOOK TITLE, EDITION, PUBLISHER, Y V. Rahghavan , Materials Science and Engineering: A	Demonstrate the metal powders producing Methods, Manufacturing and Applications. [K2] 4.5 Granulation Process T1, T2, R1 Anguation Process T1, T2, R1 Compacting and Sintering methods T1, T2, R2 Applications. [K2] 4.6 Granulation Process T1, T2, R1 Applications. [K2] 4.7 Powder Metallurgy Secondary operations T12, T1, R1 Applications of powder metallurgical products Magnesium Metal Powder T1, T2, R3 CERAMIC AND ADVANCED MATERIALS CERAMIC AND ADVANCED MATERIALS 5.1 Ceramics and its types-glasses, cermets & abrasive materials 5.2 Composites and its types T1, T2, R1 5.3 Composite manufacturing methods 5.4 Particle and fiber reinforced composite and Metal Matrix Composite and Metal Matrix Composite and Metal Matrix Composite and Carbon - Carbon Composite T1, T2, R1 CUMULATIVE PROPOSED PERIODS COMS: Atomization and Chemical T1, T2, R3 TOTAL T1, T2, R2 TOTAL CUMULATIVE PROPOSED PERIODS COMS: Atomization and Chemical T1, T2, R3 T1, T2, R2 T1, T2, R1 T2, T1, R2 T2, T1, R3 T3, T2, R1 T2, T1, R1	A-2 powders 12, 11, Kl 1	



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T2	Sidney H.Avener, Introduction to Physical Metallurgy, 2 nd Edition, Tata McGraw Hill Edition. 2011
Refere	nce Books:
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
R1	V.D. Kodgire, S. V. Kodgire, Material science and metallurgy, 42 Edition, Everest Publishing
R2	R. Balasubramaniam, Callister's, Material Science and Engineering, 2 nd Edition, Wiley, 2014
R3	O. P. Khanna, Material Science & Metallurgy, 2nd Edition, Dhanpatrai publications, 2014
R4	R. K. Rajput, Engineering materials and metallurgy, Revised edition, S.Chand & company, 2012

		Name	Signature with Date
i.	Faculty	Dr.R.Sanjeev Kumar	Solar
ii.	Course Coordinator	Dr.R.Sanjeev Kumar	Sawi.
iii.	Module Coordinator	Dr.Francis Luther King M	Theling
iv.	Programme Coordinator	Dr. Gopichand A	4.8-1

Principal