LESSON PLAN

Discipline: **Metallurgy Engineering**			Semester: **5th semester**	Name of the Teaching Faculty: **Miss Sitanjali Khuntia**
Subject: **HEAT TREATMENT TECHNOLOGY** Sub code: **Th.3**			No of days /week class allotted:**04/week**	Semester from Date:**16/09/2022 to 22/12/2022** No of weeks:**17**
Month	**Week**	**No of periods available**	**Class Day**	**Theory topics to be covered**
September	1st	01P	17-09-22	1.0 Introduction to heat treatment, Solid State Phase Transformation
	2nd	04P	19-09-22	1.1 Give an introduction to diffusion, state fick's law.
			20-09-22	1.2 Discuss the formation of austenite, austenite grain growth on heating
			22-09-22	1.3 Explain the mechanism of formation of austenite, austenitic grain size
			24-09-22	1.4 Discuss austenitic grain size. 1.5 Explain the methods of determination of austenitic grain size.
	3rd	03P	26-09-22	1.6 State the importance of grain size
			27-09-22	1.7 Explain the method of measurement of grain size. 1.8 Discuss the methods of control austenitic grain size
			29-09-22	1.9 Discuss decomposition of austenite and pearlitic transformation. 1.10 Explain the process of construction of T-T-T diagram
October	4th	01P	01-10-22	1.11 Discuss the TTT Diagram for hypo eutectoid, eutectoid and hyper eutectoid steel, Applications of TTT diagram, limitations of TTT curve
	5th	04P	10-10-22	1.11Construction of CCT diagram
			11-10-22	1.12 Explain bainitic transformation. 1.13 Explain martensitic transformation.
			13-10-22	Revision
			15-10-22	
	6th	04P	17-10-22	2.0 Heat Treatment Process for Steels. 2.1 Discuss annealing
			18-10-22	2.1 Discuss annealing. 2.2 Explain stress relieving annealing
			20-10-22	2.3 Explain different types of annealing: homogenizing annealing, recrystallisation annealing, isothermal annealing, process annealing
			22-10-22	Monthly Test
	7th	04P	25-10-22	2.4 Explain the process of normalizing, comparison between annealing and normalization.
			27-10-22	2.5 Discuss the process of hardening.

				2.6 Describe the factors affecting hardening process.
			29-10-22	2.7 Explain different methods of hardening. Process of quenching.
	8th	01P	31-10-22	2.8 Discuss quenching media and different types of quenchants: water, oil, brine, polymer quenchant, salt bath.
November	9th	03P	01-11-22	2.9 Explain the tempering process for steel. 2.10 Discuss thermo-mechanical treatment of steel.
			03-11-22	2.11 Discuss martempering, austempering and subzero treatment.
			05-11-22	3.1 Define hardenability 3.2 Discuss the method of determination of hardenability (Gross Man's critical diameter method)
	10th	03P	07-11-22	3.2 Discuss the method of determination of hardenability (Jominey end quench method).
			10-11-22	3.3 Discuss the method of estimation of hardenability from chemical composition and fracture test
			12-11-22	3.4 Discuss the factors affecting hardenability: effect of austenitic grain size, carbon content, and alloying elements.
	11th	04P	14-11-22	Revision
			15-11-22	
			17-11-22	Internal assessment/Class Test
			19-11-22	
	12th	04P	21-11-22	4 Surface Hardening Methods 4.1 Discuss high frequency induction hardening
			22-11-22	4.1 flame hardening, electron beam hardening, laser hardening.
			24-11-22	4.2 Discuss the methods of case depth measurement of steel.
			26-11-22	4.3 Explain different carburizing-processes of steel: pack carburizing.
	13th	03P	28-11-22	4.3 Explain different carburizing-processes of steel: liquid carburizing, gas carburizing and vacuum carburizing.
			29-11-22	4.4 Discuss the post carburizing heat treatment.
December	14th	02P	01-12-22	4.5 Explain process of nitriding of steel. 4.6 Explain the process of cyaniding, carbo-nitriding of steel
			03-12-22	4.7 Explain the plasma nitriding. 4.8 Explain salt bath nitro carburizing
	15th	03P	05-12-22	4.9 Explain boronising, chromizing & Toyato diffusion process.
			06-12-22	5.0 Discuss the Heat Treatment of Non Ferrous Alloys: introduction
			08-12-22	5.1 Discuss Age Hardening or precipitation hardening of Al-Cu alloys, types of precipitates.

	16th	04P	10-12-22	5.1 Discuss Age Hardening or precipitation hardening of Al-Cu alloys, types of precipitates.
			12-12-22	6.0 Alloy Steels 6.1 Discuss different alloy steels- low alloy and high alloy steels.
			13-12-22	6.2 Discuss the effect of alloying elements on steel.
			15-12-22	6.3 Discuss die steel, high speed steel
	17th	04P	17-12-22	6.3 Discuss high strength, low alloy steels, stainless steels.
			19-12-22	6.4 Discus the heat treatment of tool steel and stainless steel
			20-12-22	Revision & Doubt Clearing Class
			22-12-22	Revision & Doubt Clearing Class

PREPARED BY
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16-12-22

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