MERI College of Engineering and Technology
(MERI - CET)

Lesson Plan

Name of the Faculty : Mr. Pardeep

Discipline : Mechanical Engineering

Semester : 4th

Subject : Material Engineering (PCC-ME-208G)

Lesson Plan Duration : 15 Weeks (from May. 2021 to August 2021)

** Work Load (Lecture) per week (in hours): Lectures-04, Practicals-01

Week	Theory		Practical	
	Lecture Day	Topic (including assignment/test)	Practical day	Topic
1st	1st	Crystal Structure: Unit cells,	1st	To study crystal structures of a given specimen.
	2nd	Metallic crystal structures. Ceramics.		
	3rd	Imperfection in solids: Point, line imperfections.		
	4th	Interfacial and volume defects.		
2nd	5th	Dislocation strengthening mechanisms	2nd	To study crystal imperfections in a given specimen.
	6th	slip systems.		
	7th	Critically resolved shear stress.		
	8th	Mechanical Property measurement: Tensile tests.		
3rd	9th	compression and torsion tests.	3rd	To study microstructures of metals/ alloys.
	10th	Young's modulus, relations between true and engineering stress-strain curves,		
	11th	generalized Hooke's law.		
	12th	Yielding and yield strength.		

4th	13th	ductility, resilience, toughness	4th	To prepare solidification curve for a given specimen.
	14th	elastic recovery.		
	15th	Hardness: Rockwell, Brinell Tests		
	16th	Vickers and their relation to strength.		
5th	17th	Static failure theories: Ductile and brittle failure mechanisms,	5th	To study heat treatment processes (hardening and tempering) of steel specimen.
	18th	Tresca, Von-mises, Maximum normal stress.		
	19th	Mohr-Coulomb and Modified Mohr-Coulomb; Fracture mechanics:		
	20th	Introduction to Stress intensity factor approach and Griffith criterion.		
6th	21st	Fatigue failure: High cycle fatigue.	6th	To study microstructure of heat-treated steel.
	22nd	Stress-life approach.		
	23rd	SN curve, endurance and fatigue limits.		
	24th	Effects of mean stress using the Modified Goodman diagram.		
7th	25th	Fracture with fatigue.	7th	To study thermo-setting of plastics.
	26th	Introduction to non-destructive testing (NDT).		
	27th	Alloys, substitution and interstitial		
	28th	solid solutions- Phase diagrams.		
8th	29th	Interpretation of binary phase diagrams.	8th	To study the creep behavior of a given specimen. emmisivity with surface temperature.
	30th	microstructure development.		
	31st	Eutectic, peritectic, peritectoid and monotectic reactions.		
	32nd	Iron Iron-carbide phase diagram.		
9th	33rd	microstrctural aspects of ledeburite, austenite, ferrite and cementite.	9th	To study the mechanism of chemical corrosion and its protection.

	34th	cast iron.TTT-curve.		
	35th	Heat treatment of Steel: Annealing, tempering,		
	36th	normalising and spheroidising.		
10th	37th	Isothermal transformation diagrams for Fe-C alloys.	10th	To study the properties of various types of plastics.
	38th	Microstructure development.		
	39th	Continuous cooling curves.		
	40th	Interpretation of final microstructures and properties.		
11th	41st	Austempering, martempering, case hardening,	11th	To study Bravais lattices with the help of models.
	42nd	carburizing, nitriding, cyaniding.		
	43rd	carbo-nitriding, flame and induction hardening,		
	44th	vacuum and plasma hardening.		
12th	45th	Alloying of steel, properties of stainless steel and tool steels.	12th	To study crystal structures and crystals imperfections using ball models.
	46th	maraging steels- cast irons.		
	47th	grey, white, malleable irons.		
	48th	spheroidal cast irons.		
13th	49th	copper and copper alloys.	13th	Revision.
	50th	brass, bronze and cupro-nickel alloys		Revision.
	51st	Aluminium and Al-Cu – Mg alloys-		Revision.
	52nd	Nickel based superalloys and Titanium alloys.		Revision.
14th	53rd	Revision.	14th	Revision.
	54th	Revision.		Revision.
	55th	Revision.		Revision.
	56th	Revision.		Revision.
15th	57th	Revision.	15th	Revision.
	58th	Revision		Revision.
	59th	Revision.		Revision.
	60th	Revision.		Revision.

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