

Lesson Plan

Name of Institute : Ambala College of Engineering and Applied Research
 Name of the Faculty member : Satbir Singh
 Discipline : Mechanical Engineering
 Semester : 4th
 Subject : Materials Engineering (ES-204)
 Lesson Plan Duration : 15 weeks (from January 2020 to April 2020)
 Work Load : L=3 T=0 P=3

Week	Theory		Practical	
	Lecture day	Topic (including assignment/ test)	Practical day	Topic
1 st	1	Review of Crystal Structure, Space Lattice, Co-ordination Number	1	To study the components and functions of Metallurgical Microscope
	2	Number of Atoms per Unit Cell, Atomic Packing Factor		
	3	Numerical Problems Related to Crystallography		
2 nd	4	Crystal Imperfections and their Classifications	2	To learn about the process of Specimen Preparation for metallographic examination
	5	Point Defects, Line Defects, Edge & Screw Dislocations		
	6	Surface Defects, Volume Defects		
3 rd	7	Introduction to Engineering materials, Steel Terminology	3	To perform Standard test Methods for Estimation of Grain Size
	8	Standard Designation System for Steels		
	9	Indian Standard specifications for steels as per BIS		
4 th	10	Based on Ultimate Tensile Strength and based on Composition	4	To perform Microstructural Analysis of Carbon Steels and low alloy steels
	11	AISI-SAE standard designation for Steels and Aluminium Alloys		
	12	Alloy Systems, Solid solutions, Hume Rothery's Rules		
5 th	13	Intermediate phases, Phase Diagrams, Gibbs Phase Rule	5	To perform Microstructural Analysis of Cast Iron
	14	Cooling curves, The Lever Rule, binary phase diagrams		
	15	Applications of Phase Diagrams, Phase Transformation		
6 th	16	Micro constituents of Fe-C system, Allotropic Forms of Iron	6	To perform Microstructural Analysis of Non-Ferrous Alloys: Brass & Bronze
	17	Iron-iron carbide phase diagram		
	18	Modified Iron Carbon Phase Diagrams		
7 th	19	SESSIONAL-1	7	To perform Microstructural Analysis of Non-Ferrous Alloys: Aluminium Alloys
	20	Isothermal Transformation, TTT Curve,		
	21	Heat treatment, Annealing, Normalising, Hardening, Tempering		
8 th	22	Case Hardening, Ageing, Aus tempering and Mar tempering	8	To Perform Hardening of a steel specimen and to analyze its microstructure
	23	Surface Hardening, Mass Effect, Equipments for Heat Treatment		
	24	Major Defects in Metals or Alloys due to faulty Heat treatment.		
9 th	25	Elastic and Plastic Deformation, Mechanism of Plastic Deformation,	9	Viva-Voce
	26	Slip, Critical Resolved Shear Stress, Twinning,		
	27	Conventional and True Stress Strain Curves for Polycrystalline Materials		
10 th	28	Yield Point Phenomena, Bauschinger Effect, Work Hardening.	10	
	29	Fatigue fracture, fatigue failure, Mechanism of Fatigue Failure		
	30	Fatigue Life calculations, Fatigue Tests, Theories of Fatigue.		
11 th	31	Creep Curve, Types, Factors affecting Creep, Mechanism of Creep	11	
	32	SESSIONAL-2		

	33	Creep Resistant Material, Creep Fracture, Creep , Stress Rup test.		
12 th	34	Phase analysis, Dendritic growth, Cracks and other defects	12	
	35	Slip, Critical Resolved Shear Stress, Twinning,		
	36	Conventional and True Stress Strain Curves for Polycrystalline Materials		
13 th	37	Yield Point Phenomena, Bauschinger Effect, Work Hardening.	13	
	38	Fatigue fracture, fatigue failure, Mechanism of Fatigue Failure		
	39	Fatigue Life calculations ,Fatigue Tests, Theories of Fatigue.		
14 th	40	Creep Curve , Types , Factors affecting Creep, Mechanism of Creep	14	
	41	Creep Resistant Material, Creep Fracture, Creep , Stress Rup test.		
	42	Phase analysis, Dendritic growth, Cracks and other defects		
15 th	43	Inclusion size, shape and distribution	15	
	44	SESSIONAL-3		
	45			

(Signature of the teacher concerned with date)