



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY  
SERGARH-756060, BALASORE (ODISHA)  
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



## LESSON PLAN

**SUBJECT: TH-3( ENGINEERING MATERIAL)**

### CHAPTERWISE DISTRIBUTION OF PERIODS

SLNO	NAME OF THE CHAPTER AS PER SYLLABUS	NO OF SYLLABUS AS PER SYLLABUS	NO OF PERIODS ACTUALLY NEEDED
1	Engineering materials and their properties	5	5
2	Ferrous Materials and alloy	5	5
3	Iron – Carbon system	8	8
4	Crystal imperfections	10	10
5	Heat Treatment	10	10
6	Non-ferrous alloys	10	10
7	Bearing Material	3	3
8	Spring materials	3	3
9	Polymers	3	3
10	Composites and Ceramics	3	3
	<b>TOTAL PERIOD</b>	<b>60</b>	<b>60</b>

Discipline: MECH/AUTO ENGINEERING	Semester: 3rd	Name of the Teaching Faculty: Er. Santosh kumar
Week	Class Day	Theory / Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	Introduction to Engineering Material .
	2 <sup>nd</sup>	1.0 Engineering materials and their properties 1.1 Material classification into ferrous and non ferrous category and alloys
	3 <sup>rd</sup>	1.2 Properties of Materials: Physical , Chemical and Mechanical
	4 <sup>th</sup>	1.2 Properties of Materials: Physical , Chemical and Mechanical
	5 <sup>th</sup>	1.3 Performance requirements
2 <sup>nd</sup>	1 <sup>st</sup>	1.4 Material reliability and safety
	2 <sup>nd</sup>	2.0 Ferrous Materials and alloys 2.1 Characteristics and application of ferrous materials
	3 <sup>rd</sup>	2.2 Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel
	4 <sup>th</sup>	2.2 Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel
	5 <sup>th</sup>	2.3 Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel
3 <sup>rd</sup>	1 <sup>st</sup>	2.4 Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,
	2 <sup>nd</sup>	CLASS TEST
	3 <sup>rd</sup>	3.0 Iron – Carbon system 3.1 Concept of phase diagram and cooling curves
	4 <sup>th</sup>	3.1 Concept of phase diagram and cooling curves
	5 <sup>th</sup>	3.1 Concept of phase diagram and cooling curves
4 <sup>th</sup>	1 <sup>st</sup>	3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	2 <sup>nd</sup>	3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	3 <sup>rd</sup>	3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	4 <sup>th</sup>	3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
	5 <sup>th</sup>	3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel
5 <sup>th</sup>	1 <sup>st</sup>	MIDSEM EXAM
	2 <sup>nd</sup>	MIDSEM EXAM
	3 <sup>rd</sup>	4.0 Crystal imperfections 4.1 Crystal defines, classification of crystals, ideal crystal and crystal imperfections
	4 <sup>th</sup>	4.0 Crystal imperfections Crystal defines, classification of crystals, ideal crystal and crystal imperfections
	5 <sup>th</sup>	4.1 Crystal defines, classification of crystals, ideal crystal and crystal imperfections

6 <sup>th</sup>	1 <sup>st</sup>	4.1 Crystal defines, classification of crystals, ideal crystal and crystal imperfections
	2 <sup>nd</sup>	4.2 Classification of imperfection: Point defects, line defects, surface defects and volume defects
	3 <sup>rd</sup>	4.2 Classification of imperfection: Point defects, line defects, surface defects and volume defects
	4 <sup>th</sup>	4.3 Types and causes of point defects: Vacancies, Interstitials and impurities
	5 <sup>th</sup>	4.4 Types and causes of line defects: Edge dislocation and screw dislocation
7 <sup>th</sup>	1 <sup>st</sup>	4.5 Effect of imperfection on material properties
	2 <sup>nd</sup>	4.6 Deformation by slip and twinning
	3 <sup>rd</sup>	4.7 Effect of deformation on material properties
	4 <sup>th</sup>	CLASS TEST
	5 <sup>th</sup>	5.0 Heat Treatment 5.1 Purpose of Heat treatment
8 <sup>th</sup>	1 <sup>st</sup>	5.1 Purpose of Heat treatment
	2 <sup>nd</sup>	5.2 Process of heat treatment: Annealing, normalizing, hardening, tempering, stress relieving measures
	3 <sup>rd</sup>	5.2 Process of heat treatment: Annealing, normalizing, hardening, tempering, stress relieving measures
	4 <sup>th</sup>	5.3 Surface hardening: Carburizing and Nitriding
	5 <sup>th</sup>	5.3 Surface hardening: Carburizing and Nitriding
9 <sup>th</sup>	1 <sup>st</sup>	5.4 Effect of heat treatment on properties of steel
	2 <sup>nd</sup>	5.4 Effect of heat treatment on properties of steel
	3 <sup>rd</sup>	5.5 Hardenability of steel
	4 <sup>th</sup>	5.5 Hardenability of steel
	5 <sup>th</sup>	CLASS TEST
10 <sup>th</sup>	1 <sup>st</sup>	6.0 Non-ferrous alloys 6.1 Aluminum alloys: Composition, property and usage of Duralmin, $\gamma$ - alloy.
	2 <sup>nd</sup>	6.0 Non-ferrous alloys 6.1 Aluminum alloys: Composition, property and usage of Duralmin,
	3 <sup>rd</sup>	6.0 Non-ferrous alloys 6.1 Aluminum alloys: Composition, property and usage of Duralmin,
	4 <sup>th</sup>	6.1 Aluminum alloys: Composition, property and usage of Duralmin, $\gamma$ - alloy.
	5 <sup>th</sup>	6.2 Copper alloys: Composition, property and usage of Copper- Aluminum, Copper-Tin, Babbit , Phosphorous bronze, brass, Copper- Nickel
11 <sup>th</sup>	1 <sup>st</sup>	6.2 Copper alloys: Composition, property and usage of Copper- Aluminum, Copper-Tin, Babbit , Phosphorous bronze, brass, Copper- Nickel
	2 <sup>nd</sup>	6.2 Copper alloys: Composition, property and usage of Copper- Aluminum, Copper-Tin, Babbit , Phosphorous bronze, brass, Copper- Nickel
	3 <sup>rd</sup>	6.3 Predominating elements of lead alloys, Zinc alloys and Nickel alloys
	4 <sup>th</sup>	6.3 Predominating elements of lead alloys, Zinc alloys and Nickel alloys

11 <sup>th</sup>	5 <sup>th</sup>	6.4 Low alloy materials like P-91, P-22 for power plants and other high temperature services. High alloy materials like stainless
12 <sup>th</sup>	1 <sup>st</sup>	6.4 Low alloy materials like P-91, P-22 for power plants and other high temperature services. High alloy materials like stainless
	2 <sup>nd</sup>	6.4 Low alloy materials like P-91, P-22 for power plants and other high temperature services. High alloy materials like stainless
	3 <sup>rd</sup>	CLASS TEST
	4 <sup>th</sup>	7. Bearing Material 7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
	5 <sup>th</sup>	7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
13 <sup>th</sup>	1 <sup>st</sup>	7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials
	2 <sup>nd</sup>	8.0 Spring materials 8.1 Classification, composition, properties and uses of Iron- base and Copper base spring material
	3 <sup>rd</sup>	8.1 Classification, composition, properties and uses of Iron- base and Copper base spring material
	4 <sup>th</sup>	8.1 Classification, composition, properties and uses of Iron- base and Copper base spring material
	5 <sup>th</sup>	CLASS TEST
14 <sup>th</sup>	1 <sup>st</sup>	9.0 Polymers 9.1 Properties and application of thermosetting and thermoplastic polymers
	2 <sup>nd</sup>	9.1 Properties and application of thermosetting and thermoplastic polymers
	3 <sup>rd</sup>	9.2 Properties of elastomers
	4 <sup>th</sup>	10.0 Composites and Ceramics 10.1 Classification, composition, properties and uses of particulate based and fiber reinforced composites
	5 <sup>th</sup>	10.1 Classification, composition, properties and uses of particulate based and fiber reinforced composites
15 <sup>th</sup>	1 <sup>st</sup>	10.2 Classification and uses of ceramics
	2 <sup>nd</sup>	CLASS TEST
	3 <sup>rd</sup>	Revision .