



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



## LESSON PLAN

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

### CHAPTER WISE DISTRIBUTION OF PERIODS

Sl no	Name of the chapter as per the Syllabus	No of Periods as per syllabus	No of periods actually needed
1	Engineering materials and their properties	5	5
2	Ferrous Materials and alloy	5	6
3	Iron–Carbon system	8	9
4	Crystal imperfections	10	10
5	Heat Treatment	10	12
6	Non-ferrous alloys	10	10
7	Bearing Material	3	4
8	Spring materials	3	3
9	Polymers	3	4
10	Composites and Ceramics	3	5
	<b>TOTAL PERIOD</b>	<b>60</b>	<b>68</b>

Discipline: MECHANICAL ENGINEERING	Semester: 3rd	Name of the Teaching Faculty:- Er. Santosh Kumar	
		SESSION:2023-24	EXAMINATION:2023(W)
Week	Class Day	Topics to be covered	
1 <sup>st</sup>	1 <sup>st</sup>	<b>Introduction to Engineering Material.</b>	
	2 <sup>nd</sup>	Engineering materials and their properties	
	3 <sup>rd</sup>	1.2 Properties of Materials:Physical,Chemical and Mechanical	
	4 <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>	<b>2.0 Ferrous Materials and alloys</b> 2.1 Characteristics and application of ferrous materials	
	3 <sup>rd</sup>	2.0 Ferrous Materials and alloys 2.1 Characteristics and application of ferrous materials	
	4 <sup>th</sup>	2.2 Classification,composition and application of low carbon steel,medium carbon steel and High carbon steel	
3 <sup>rd</sup>	1 <sup>st</sup>	2.3 Alloy steel:Low alloy steel,high alloy steel,tool steel and stainless steel	
	2 <sup>nd</sup>	2.4 Toolsteel: Effect of various alloying elements such as Cr,Mn,Ni,V,Mo,	
	3 <sup>rd</sup>	2.4 Toolsteel: Effect of various alloying elements such as Cr,Mn,Ni,V,Mo,	
	4 <sup>th</sup>	<b>3.0 Iron–Carbon system</b> 3.1 Concept o phase diagram and cooling curves	
4 <sup>th</sup>	1 <sup>st</sup>	3.0 Iron–Carbon system 3.1 Concept o phase diagram and cooling curves	
	2 <sup>nd</sup>	3.1 Concept of phase diagram and cooling curves	
	3 <sup>rd</sup>	3.1 Concept of phase diagram and cooling curves	
	4 <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>	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	
6 <sup>th</sup>	1 <sup>st</sup>	<b>4.0 Crystal imperfections</b> 4.1 Crystal defines,classification of crystals,ideal crystal and crystal imperfections	
	2 <sup>nd</sup>	4.1 Crystal defines,classification of crystals,idea lcrystal and crystal imperfections	
	3 <sup>rd</sup>	4.1 Crystal defines,classification of crystals,idea lcrystal and crystal imperfections	
	4 <sup>th</sup>	4.2 Classification of imperfection:Point defects,line defects,surface defects and volume defects	

Week	Class Day	Topics to be covered
7 <sup>th</sup>	1 <sup>st</sup>	4.2 Classification of imperfection:Point defects,line defects,surface defects and volume defects
	2 <sup>nd</sup>	4.3 Types and causes of point defects:Vacancies,Interstitials and impurities
	3 <sup>rd</sup>	4.4 Types and causes of line defects:Edge dislocation and screw dislocation
	4 <sup>th</sup>	4.5 Effect of imperfection on material properties
8 <sup>th</sup>	1 <sup>st</sup>	4.6 Deformation by slip and twinning
	2 <sup>nd</sup>	4.7 Effect of deformation on material properties
	3 <sup>rd</sup>	<b>5.0 HeatTreatment</b>
	4 <sup>th</sup>	5.1 Purpose of Heat treatment
9 <sup>th</sup>	1 <sup>st</sup>	5.2 Process of heat treatment: Annealing, normalizing, hardening, tempering, stress relieving measures
	2 <sup>nd</sup>	5.2 Process of heat treatment: Annealing, normalizing, hardening, tempering, stress relieving measures
	3 <sup>rd</sup>	5.3 Surface hardening:Carburizing and Nitriding
	4 <sup>th</sup>	5.3 Surface hardening:Carburizing and Nitriding
10 <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>	5.4 Effect of heat treatment on properties of steel
	4 <sup>th</sup>	5.5 Hardenability of steel
11 <sup>th</sup>	1 <sup>st</sup>	5.5 Hardenability of steel
	2 <sup>nd</sup>	5.5 Hardenability of steel
	3 <sup>rd</sup>	<b>INTERNAL ASSESSMENT</b>
	4 <sup>th</sup>	<b>INTERNAL ASSESSMENT</b>
12 <sup>th</sup>	1 <sup>st</sup>	<b>6.0 Non-ferrous alloys</b> 6.1 Aluminum alloys:Composition,property and usage of Duralmin,y-alloy.
	2 <sup>nd</sup>	6.1 Aluminum alloys:Composition,property and usage of Duralmin,y-alloy.
	3 <sup>rd</sup>	6.1 Aluminum alloys:Composition,property and usage of Duralmin,y- alloy.
	4 <sup>th</sup>	6.2 Copper alloys:Composition,property and usage of Copper-Aluminum,Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel
13 <sup>th</sup>	1 <sup>st</sup>	6.2 Copper alloys:Composition,property and usage of Copper-Aluminum,Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel
	2 <sup>nd</sup>	6.2 Copper alloys:Composition,property and usage of Copper-Aluminum,Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel
	3 <sup>rd</sup>	6.2 Copper alloys:Composition,property and usage of Copper-Aluminum,Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel
	4 <sup>th</sup>	6.2 Copper alloys:Composition,property and usage of Copper-Aluminum,Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel
14 <sup>th</sup>	1 <sup>st</sup>	6.3 Predominating elements of lead alloys,Zinc alloys and Nickel alloys

Week	Class Day	Topics to be covered
14 <sup>th</sup>	2 <sup>nd</sup>	6.4 Low alloy materials like P-91,P-22 for power plants and other hightemperature services. High alloy materials like stainless
	3 <sup>rd</sup>	<b>7. Bearing Material</b> Classification,composition,properties and uses of Copper base,Tin Base,Lead base, Cadmium base bearing materials
	4 <sup>th</sup>	7. Bearing Material Classification,composition,properties and uses of Copper base,Tin Base,Lead base, Cadmium base bearing materials
15 <sup>th</sup>	1 <sup>st</sup>	7. Bearing Material Classification,composition,properties and uses of Copper base,Tin Base,Lead base, Cadmium base bearing materials
	2 <sup>nd</sup>	7. Bearing Material Classification,composition,properties and uses of Copper base,Tin Base,Lead base, Cadmium base bearing materials
	3 <sup>rd</sup>	<b>8.0 Spring materials</b> 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
16 <sup>th</sup>	1 <sup>st</sup>	8.1 Classification,composition,properties and uses of Iron-base and Copper base spring material
	2 <sup>nd</sup>	<b>9.0 Polymers</b> 9.1 Properties and application of thermo setting and thermoplastic polymers
	3 <sup>rd</sup>	9.1 Properties and application of thermosetting and thermoplastic polymers
	4 <sup>th</sup>	9.1 Properties and application of thermosetting and thermoplastic polymers
17 <sup>th</sup>	1 <sup>st</sup>	9.2 Properties of elastomers
	2 <sup>nd</sup>	<b>10.0 Composites and Ceramics</b> 10.1 Classification,composition,properties and uses of particulate based and fiber reinforced composites
	3 <sup>rd</sup>	10.1 Classification,composition,properties and uses of particulate based and fiber reinforced composites
	4 <sup>th</sup>	10.1 Classification,composition,properties and uses of particulate based and fiber reinforced composites
18 <sup>th</sup>	1 <sup>st</sup>	10.1 Classification,composition,properties and uses of particulate based and fiber reinforced composites
	2 <sup>nd</sup>	10.2 Classification and uses of ceramics
	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Revision

