



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



## LESSON PLAN

**SUBJECT: TH-5 ( AUTOMOBILE COMPONENT DESIGN)**

**Name of the Faculty-Er.Saroj Kumar Patra**

**Branch- Automobile Engineering**

**Session- 2024-25**

**Semester- 5th**

**Examination- 2024 (W)**

### CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	BASIC CONCEPT OF DESIGN	12	12
2	DESIGN OF MACHINE ELEMENT	6	6
3	DESIGN OF SHAFT KEY & COMPONENT	10	11
4	DESIGN OF LEVERS	6	6
5	DESIGN OF CHASSIS	10	11
6	DESIGN OF ENGINE COMPONENT	16	16
	Total Period:	60	62

*S. Patra*  
29/06/25  
sign of the faculty

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29/06/25  
Sign of H.O.D



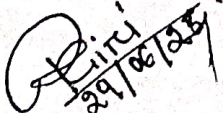
Discipline: AUTOMOBILE ENGINEERING	Semester: 5th	Name of the Teaching Faculty: Er.Saroj Kumar Patra	
		SESSION : 2024-25	EXAMINATION : 2024 (W)
Week	Class Day	Topics to be Covered	
1 <sup>st</sup>	1 <sup>st</sup>	Basic concepts of design	
	2 <sup>nd</sup>	Introduction to design	
	3 <sup>rd</sup>	Introduction to design	
	4 <sup>th</sup>	Classification of design	
2 <sup>nd</sup>	1 <sup>st</sup>	Stress analysis	
	2 <sup>nd</sup>	Types of external loads	
	3 <sup>rd</sup>	Types of induced stresses: tensile, compressive, shear crushing & bearing	
	4 <sup>th</sup>	bending, torsion, thermal stresses, creep, proof stresses resilience principal stresses.	
3 <sup>rd</sup>	1 <sup>st</sup>	Stress- strain diagram for ductile & brittle material and its importance	
	2 <sup>nd</sup>	Variable stresses machine parts, fatigue & endurance limit, stress-time diagrams for variable stresses.	
	3 <sup>rd</sup>	Working stresses for static load, variable or fatigue load	
	4 <sup>th</sup>	Factor of safety, selection of factor of safety	
4 <sup>th</sup>	1 <sup>st</sup>	Introduction to theories of failure-maximum principal theory. Maximum shear stress theory, Distribution energy theory	
	2 <sup>nd</sup>	Selection of material and justifications of automobile components, advanced materials for automotive components	
	3 <sup>rd</sup>	.Concept of standardization, preferred numbers & inter chargeability in design practice.	
	4 <sup>th</sup>	Common types of fasteners with their applications-through bolts, tap bolts, top bolts, studies cap screws and machine screws	
5 <sup>th</sup>	1 <sup>st</sup>	Bearings – classification, location in automobiles systems & selection of bearings.	
	2 <sup>nd</sup>	Post design aspects ergonomic aspect aesthetic consideration (shape, colour, surface finish) for automobile.	
	3 <sup>rd</sup>	Post design aspects ergonomic aspect aesthetic consideration (shape, colour, surface finish) for automobile.	
	4 <sup>th</sup>	Post design aspects ergonomic aspect aesthetic consideration (shape, colour, surface finish) for automobile.	
6 <sup>th</sup>	1 <sup>st</sup>	Design of machine elements.	
	2 <sup>nd</sup>	Design of socket & spigot type cotter joint	
	3 <sup>rd</sup>	Design of socket & spigot type cotter joint	
	4 <sup>th</sup>	Design of socket & spigot type cotter joint	

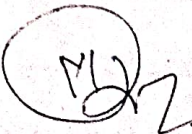


Week	Class Day	Topics to be Covered
7 <sup>th</sup>	1 <sup>st</sup>	Design of knuckle joint
	2 <sup>nd</sup>	Design of turnbuckle
	3 <sup>rd</sup>	Application of above machine elements in an automobile.
	4 <sup>th</sup>	Application of above machine elements in an automobile.
8 <sup>th</sup>	1 <sup>st</sup>	Design of shafts, keys & couplings
	2 <sup>nd</sup>	Design of shaft for torsion, rigidity, bending, combined bending & torsion..
	3 <sup>rd</sup>	Design of shaft for torsion, rigidity, bending, combined bending & torsion..
	4 <sup>th</sup>	Compression of solid & hollow shafts
9 <sup>th</sup>	1 <sup>st</sup>	INTERNAL ASSESSMENT
	2 <sup>nd</sup>	INTERNAL ASSESSMENT
	3 <sup>rd</sup>	Types of keys design of sunk rectangular key, woodruff key. Effect of keyways on shaft
	4 <sup>th</sup>	Design of coupling-muff, flange and bush pin type flexible
10 <sup>th</sup>	1 <sup>st</sup>	Design of coupling-muff, flange and bush pin type flexible
	2 <sup>nd</sup>	Design of coupling-muff, flange and bush pin type flexible
	3 <sup>rd</sup>	Design of levers.
	4 <sup>th</sup>	Types of levers
11 <sup>th</sup>	1 <sup>st</sup>	Rocker arm
	2 <sup>nd</sup>	Hand lever
	3 <sup>rd</sup>	Pedals for rectangular cross-section & fulcrum Pin only
	4 <sup>th</sup>	Pedals for rectangular cross-section & fulcrum Pin only
12 <sup>th</sup>	1 <sup>st</sup>	Design of chassis component
	2 <sup>nd</sup>	Design of cloth- single plate & multi plate
	3 <sup>rd</sup>	Teeth calculation of gears for sliding mesh/constant mesh gear box of given data.
	4 <sup>th</sup>	Design of semi elliptical leaf spring, helical spring-torsion & compression
13 <sup>th</sup>	1 <sup>st</sup>	Design of semi elliptical leaf spring, helical spring-torsion & compression



		Topics to be Covered
Week	Class Day	
13 <sup>th</sup>	2 <sup>nd</sup>	Design of engine components
	3 <sup>rd</sup>	Data of engine specifications & calculation of cylinder dimensions for given
	4 <sup>th</sup>	Design of cylinder head thickness & bolts
14 <sup>th</sup>	1 <sup>st</sup>	Design of valve seat & valve lift
	2 <sup>nd</sup>	Design of piston crown by bending strength & thermal considerations
	3 <sup>rd</sup>	Design of piston crown by bending strength & thermal considerations
	4 <sup>th</sup>	Design of piston rings & skirt length
15 <sup>th</sup>	1 <sup>st</sup>	bending & shear considerations.
	2 <sup>nd</sup>	Design of connecting rod cross-section(I-section)
	3 <sup>rd</sup>	Design of big end, cap & bolt.
	4 <sup>th</sup>	Design of big end, cap & bolt.
16 <sup>th</sup>	1 <sup>st</sup>	Design of over hung crankshaft.
	2 <sup>nd</sup>	Design of over hung crankshaft.
	3 <sup>rd</sup>	Design of over hung crankshaft.
	4 <sup>th</sup>	Revision

  
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