

**GOVERNMENT POLYTECHNIC BALASORE**  
**LESSIONPLAN–DESIGN OF MACHINE ELEMENTS**

Discipline: <b>MECHANICAL ENGG.</b>	Semester: <b>5<sup>TH</sup></b>	NameoftheTeachingFaculty: <b>SRI DEBABRATA GHOSH</b>
Subject: <b>DME (TH-2)</b>	No. of Days/perweek classallotted:4 P/W	SemesterFromdate: <b>14.07.2025</b> ToDate: <b>15.11.2025</b> No.ofWeeks:15Week
<b>Week</b>	<b>ClassDay</b>	<b>TheoryTopics</b>
1 <sup>ST</sup>	1 <sup>st</sup>	<b>Introduction</b> Introduction to Machine Design and Classify it.
	2 <sup>nd</sup>	Different mechanical engineering materials used in design with their uses and their mechanical properties.
	3 <sup>rd</sup>	Different mechanical engineering materials used in design with their uses and their physical properties.
	4 <sup>th</sup>	Define working stress, yield stress, ultimate stress.
2 <sup>ND</sup>	1 <sup>st</sup>	Factor of safety and stress.
	2 <sup>nd</sup>	Strain curve for M.S & C.I.
	3 <sup>rd</sup>	Modes of Failure (By elastic deflection).
	4 <sup>th</sup>	Modes of Failure (By general yielding & fracture).
3 <sup>RD</sup>	1 <sup>st</sup>	State the factors governing the design of machine elements.
	2 <sup>nd</sup>	State the factors governing the design of machine elements.
	3 <sup>rd</sup>	Describe design procedure.
	4 <sup>th</sup>	Describe design procedure.
4 <sup>TH</sup>	1 <sup>st</sup>	<b>Design of fastening elements</b> Joints and their classification.
	2 <sup>nd</sup>	State types of welded joints .
	3 <sup>rd</sup>	State advantages of welded joints over other joints.
	4 <sup>th</sup>	Design of welded joints for eccentric loads.
5 <sup>TH</sup>	1 <sup>st</sup>	Design of welded joints for eccentric loads.
	2 <sup>nd</sup>	State types of riveted joints and types of rivets.
	3 <sup>rd</sup>	Describe failure of riveted joints.
	4 <sup>th</sup>	Describe failure of riveted joints.
6 <sup>TH</sup>	1 <sup>st</sup>	Determine strength & efficiency of riveted joints.
	2 <sup>nd</sup>	Design riveted joints for pressure vessel.
	3 <sup>rd</sup>	Solve numerical on Welded Joint and Riveted Joints.
	4 <sup>th</sup>	<b>Monthly test or Previous year question discussion.</b>
7 <sup>TH</sup>	1 <sup>st</sup>	<b>Design of shafts and Keys</b> State function of shafts.
	2 <sup>nd</sup>	State materials for shafts.
	3 <sup>rd</sup>	Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension.

	4 <sup>th</sup>	Design solid & hollow shafts to transmit a given power at given rpm based on b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity.
8 <sup>TH</sup>	1 <sup>st</sup>	State standard size of shaft as per I.S.
	2 <sup>nd</sup>	State function of keys, types of keys & material of keys.
	3 <sup>rd</sup>	Describe failure of key, effect of key way.
	4 <sup>th</sup>	Design rectangular sunk key considering its failure against shear & crushing.
9 <sup>TH</sup>	1 <sup>st</sup>	Design rectangular sunk key by using empirical relation for given diameter of shaft.
	2 <sup>nd</sup>	State specification of parallel key, gib-head key, taper key as per I.S.
	3 <sup>rd</sup>	Solve numerical on Design of Shaft.
	4 <sup>th</sup>	Solve numerical on Design of keys.
10 <sup>TH</sup>	1 <sup>st</sup>	<b>Design of Coupling</b> Design of Shaft Coupling.
	2 <sup>nd</sup>	Requirements of a good shaft coupling.
	3 <sup>rd</sup>	Requirements of a good shaft coupling.
	4 <sup>th</sup>	Types of Coupling.
11 <sup>TH</sup>	1 <sup>st</sup>	Types of Coupling.
	2 <sup>nd</sup>	Design of Sleeve or Muff-Coupling.
	3 <sup>rd</sup>	Design of Sleeve or Muff-Coupling.
	4 <sup>th</sup>	Design of Clamp or Compression Coupling.
12 <sup>TH</sup>	1 <sup>st</sup>	Design of Clamp or Compression Coupling.
	2 <sup>nd</sup>	Solve simple numerical on above.
	3 <sup>rd</sup>	Solve simple numerical on above.
	4 <sup>th</sup>	<b>Monthly test or Previous year question discussion.</b>
13 <sup>TH</sup>	1 <sup>st</sup>	<b>Design a closed coil helical spring</b> Materials used for helical spring.
	2 <sup>nd</sup>	Standard size spring wire. (SWG).
	3 <sup>rd</sup>	Terms used in compression spring.
	4 <sup>th</sup>	Stress in helical spring of a circular wire.
14 <sup>TH</sup>	1 <sup>st</sup>	Deflection of helical spring of circular wire.
	2 <sup>nd</sup>	Surge in spring.
	3 <sup>rd</sup>	Solve numerical on design of closed coil helical compression spring.
	4 <sup>th</sup>	Solve numerical on design of closed coil helical compression spring.
15 <sup>TH</sup>	1 <sup>st</sup>	<b>Monthly test or Previous year question discussion.</b>
	2 <sup>nd</sup>	Revision
	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Revision