

Discipline : <b>MECHANICAL ENGG</b>	Semester : <b>5th</b>	Name of the Teaching Faculty:- <b>PRAVAT KUMAR SWAIN</b>
Subject: <b>DESIGN OF MACHINE ELEMENTS(TH 2)</b>	No. of days/per week class allotted: <b>04</b>	Semester From date: <b>15.09.2022</b> To Date: <b>22.12.2022</b>  No. of Weeks: <b>15</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory Topics</b>
<b>1<sup>st</sup></b>	<b>1<sup>st</sup></b>	<b>1.0 Introduction</b> 1.1 Introduction to Machine Design and Classify it.
	<b>2<sup>nd</sup></b>	1.2 Different mechanical engineering materials used in design with their uses and their mechanical and physical properties
	<b>3<sup>rd</sup></b>	1.2 Different mechanical engineering materials used in design with their uses and their mechanical and physical properties
	<b>4<sup>th</sup></b>	1.2 Different mechanical engineering materials used in

		design with their uses and their mechanical and physical properties
2 <sup>nd</sup>	1 <sup>st</sup>	1.3 Define working stress, yield stress, ultimate stress & factor of safety
	2 <sup>nd</sup>	1.3 stress –strain curve for M.S
	3 <sup>rd</sup>	1.3 stress –strain curve for C.I.
	4 <sup>th</sup>	1.4 Modes of Failure (By elastic deflection, general yielding & fracture)
3 <sup>rd</sup>	1 <sup>st</sup>	1.4 Modes of Failure (By elastic deflection, general yielding & fracture)
	2 <sup>nd</sup>	1.4 Modes of Failure (By elastic deflection, general yielding & fracture)
	3 <sup>rd</sup>	1.5 State the factors governing the design of machine elements
	4 <sup>th</sup>	1.6 Describe design procedure
4 <sup>th</sup>	1 <sup>st</sup>	<b>2.0 Design of fastening elements:</b> 2.1 Joints and their classification.
	2 <sup>nd</sup>	2.2 State types of welded joints

	3 <sup>rd</sup>	2.3 State advantages of welded joints over other joints.
	4 <sup>th</sup>	2.4 Design of welded joints for eccentric loads
5 <sup>th</sup>	1 <sup>st</sup>	2.4 Design of welded joints for eccentric loads
	2 <sup>nd</sup>	Solve numerical on Welded Joint
	3 <sup>rd</sup>	2.5 State types of riveted joints and types of rivets.
	4 <sup>th</sup>	2.6 Describe failure of riveted joints.
6 <sup>th</sup>	1 <sup>st</sup>	2.7 Determine strength & efficiency of riveted joints.
	2 <sup>nd</sup>	Solve numerical on Riveted Joint
	3 <sup>rd</sup>	2.8 Design riveted joints for pressure vessel.
	4 <sup>th</sup>	2.9 Solve numerical on Welded Joint and Riveted Joints.
7 <sup>th</sup>	1 <sup>st</sup>	<b>3.Design of shafts and Keys:</b> 3.1 State function of shafts. 3.2 State materials for shafts.
	2 <sup>nd</sup>	3.3 Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i)

		Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity
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	3 <sup>rd</sup>	3.3 Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity
	4 <sup>th</sup>	3.3 Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined

		bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity
8 <sup>th</sup>	1 <sup>st</sup>	Solve numerical on Design of Shaft
	2 <sup>nd</sup>	3.4 State standard size of shaft as per I.S.
	3 <sup>rd</sup>	3.5 State function of keys, types of keys & material of keys.
	4 <sup>th</sup>	3.6 Describe failure of key, effect of key way.
9 <sup>th</sup>	1 <sup>st</sup>	3.7 Design rectangular sunk key considering its failure against shear & crushing.
	2 <sup>nd</sup>	3.8 Design rectangular sunk key by using empirical relation for given diameter of shaft.
	3 <sup>rd</sup>	3.9 State specification of parallel key, gib-head key, taper key as per I.S.
	4 <sup>th</sup>	3.10 Solve numerical on Design of keys.
10 <sup>th</sup>	1 <sup>st</sup>	<b>4.0 Design of Coupling:</b> 4.1 Design of Shaft Coupling
	2 <sup>nd</sup>	4.2 Requirements of a good shaft coupling
	3 <sup>rd</sup>	4.3 Types of Coupling.
	4 <sup>th</sup>	4.4 Design of Sleeve or Muff-Coupling.
11 <sup>th</sup>	1 <sup>st</sup>	4.4 Design of Sleeve or Muff-Coupling.
	2 <sup>nd</sup>	4.4 Solve simple numerical on above
	3 <sup>rd</sup>	4.5 Design of Clamp or Compression Coupling

	4 <sup>th</sup>	4.5 Design of Clamp or Compression Coupling
12 <sup>th</sup>	1 <sup>st</sup>	4.5 Design of Clamp or Compression Coupling
	2 <sup>nd</sup>	4.6 Solve simple numerical on above
	3 <sup>rd</sup>	4.6 Solve simple numerical on above
	4 <sup>th</sup>	4.6 Solve simple numerical on above
13 <sup>th</sup>	1 <sup>st</sup>	<b>5.0 Design a closed coil helical spring:</b> 5.1 Materials used for helical spring.
	2 <sup>nd</sup>	5.2 Standard size spring wire. (SWG).
	3 <sup>rd</sup>	5.3 Terms used in compression spring.
	4 <sup>th</sup>	5.4 Stress in helical spring of a circular wire.
14 <sup>th</sup>	1 <sup>st</sup>	5.4 Stress in helical spring of a circular wire.
	2 <sup>nd</sup>	Solve numerical on design of closed coil helical compression spring.
	3 <sup>rd</sup>	5.5 Deflection of helical spring of circular wire.
	4 <sup>th</sup>	5.5 Deflection of helical spring of circular wire.
15 <sup>th</sup>	1 <sup>st</sup>	Solve numerical on design of closed coil helical compression spring.
	2 <sup>nd</sup>	5.6 Surge in spring.
	3 <sup>rd</sup>	5.7 Solve numerical on design of closed coil

		helical compression spring.
	4 <sup>th</sup>	5.7 Solve numerical on design of closed coil helical compression spring.

**Learning Resources:**

01. Machine Design by Pandya & Shah, Charotar PP
02. A Textbook of Machine Design by R.S. Khurmi & J.K Gupta, S. Chand

03. A Textbook of Machine Design by P.C. Sharma &D.K .Agrawal,S,K,Kataria

04. Design of Machine Elements by V.B. Bhandari, TMH

05. Design Data Book by S.MD. Jalaudeen, Anuradha

Publication

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