

MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN							
Department of Mechanical Engineering							
Name of the Subject	DESIGN OF TRANSMISSION SYSTEMS			Name of the handling Faculty	D. SAKTHIVEL		
Subject Code	ME8651			Year / Sem	III/ VI		
Acad Year	2021-2022			Batch	2019-2023		
Course Objective							
To gain knowledge on the principles and procedure for the design of Mechanical power Transmission components							
To understand the standard procedure available for Design of Transmission of Mechanical elements							
To learn to use standard data and catalogues(Use of P S G Design Data Book permitted)							
Course Outcome							
CO1 apply the concepts of design to belts, chains and rope drives.							
CO2 apply the concepts of design to spur, helical gears.							
CO3 apply the concepts of design to worm and bevel gears							
CO4 apply the concepts of design to gear boxes .							
CO5 apply the concepts of design to cams, brakes and clutches							
Lesson Plan							
Sl. No.	Topic(s)	T / R* Book	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	Blooms Level (L1-L6)	CO	PO
UNIT I							
1	Design of Flat belts and pulleys	T1	3	BB	L3	CO1	PO1, PO2,PO3
2	Selection of V belts and pulleys	T1	2	PPT	L2	CO1	PO1, PO2,PO3
3	Selection of hoisting wireropes and pulleys	T1	2	BB	L2	CO1	PO1, PO2,PO3
4	Design of Transmission chains and Sprockets	T1	3	BB	L3	CO1	PO1, PO2,PO3
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
* Assignment given to the students							
Evaluation method							
* assignments are evaluated by online screening through viva voice,marks were given based on the students answer to the question.							

UNIT II							
5	Gear Terminology, Speed ratios and number of teeth	T1	2	NPTEL	L1	CO2	PO1, PO10
6	Force analysis Tooth stresses Dynamic effects	T1	1	BB	L3	CO2	PO2, PO10
7	Fatigue strength Factor of safety Gear materials	T1	1	BB	L3	CO2	PO1, PO10
8	Design of straight tooth spur based on strength and wear considerations	T1	2	PPT	L3	CO2	PO3, PO10
9	Design of helical gears based on strength and wear considerations	T1	2	BB	L3	CO2	PO3, PO10
10	Pressure angle in the normal and transverse plane Equivalent number of teeth forces for	T1	2	BB	L2	CO2	PO2, PO10
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any * Assignment given to the students							
Evaluation method * assignments are evaluated by online screening through viva voice,marks were given based on the students answer to the question.							
UNIT III							
11	Straight bevel gear: Tooth terminology	T1	1	BB	L1	CO3	PO1, PO2
12	Tooth forces and stresses, equivalent number of teeth	T1	1	BB	L3	CO3	PO1, PO2
13	Estimating the dimensions of pair of straight bevel gears	T1	1	BB	L3	CO3	PO1, PO2,PO3
14	Worm Gear: Merits and demerits terminology	T1	1	PPT	L1	CO3	PO1, PO2
15	Thermal capacity, materials forces and stresses, efficiency	T1	1	BB	L2	CO3	PO1, PO2,PO3
16	Estimating the size of the worm gear pair	T1	1	BB	L3	CO3	PO1, PO2,PO3
17	Cross helical, Terminology helix angles	T1	2	BB	L2	CO3	PO1, PO2
18	Estimating the size of the pair of cross helical gears	T1	2	BB	L2	CO3	PO1, PO2,PO3
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any *Case studies given to the students							
Evaluation method: Evalution of Case studies report.							
UNIT IV							
19	Geometric progression - Standard step ratio	T1	1	BB	L1	CO4	PO1, PO2
20	Ray diagram, kinematics layout	T1	2	BB	L2	CO4	PO1, PO2
21	Design of slidingmesh gear box	T1	2	PPT	L3	CO4	PO1, PO2,PO3
22	Design of multi speed gear box for machine tool applications	T1	2	BB	L3	CO4	PO1, PO2,PO3

23	Constant meshgear box - Speed reducer unit	T1	2	BB	L3	CO4	PO1, PO2,PO3
24	Variable speed gear box	T1	1	BB	L3	CO4	PO1, PO2
25	Fluid Couplings, Torque Converters for automotive applications	T1	2	BB	L2	CO4	PO1, PO2

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

*** Quiz given to the students**

Evaluation method

*** Quiz are evaluated by online.**

UNIT V

26	Cam Design, Types	T1	1	BB	L1	CO5	PO1
27	Pressure angle and under cutting base circle	T1	1	BB	L1	CO5	PO1, PO2
28	Determination forces and surfacestresses	T1	2	BB	L2	CO5	PO1, PO2
29	Design of plate clutches	T1	2	BB	L3	CO5	PO1, PO2,PO3
30	Axial clutches	T1	1	BB	L3	CO5	PO1
31	Cone clutches	T1	1	BB	L3	CO5	PO1
32	Internal expanding rim clutches	T1	1	BB	L3	CO5	PO1
33	Electromagnetic clutches	T1	1	BB	L1	CO5	PO1
34	Band and Block brakes	T1	1	BB	L2	CO5	PO1, PO2,PO3
35	External shoe brakes, Internal expanding shoebrake	T1	1	BB	L2	CO5	PO1, PO2,PO3

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

*** MCQ given to the students**

Evaluation method

*** MCQ marks were given based on the students answer to the question.**

Content Beyond the Syllabus Planned

1	Design of jigs and fixture
2	

Text Books

1	Bhandari V, “Design of Machine Elements”, 4th Edition, Tata McGraw-Hill Book Co, 2016.
2	Joseph Shigley, Charles Mischke, Richard Budynas and Keith Nisbett “Mechanical Engineering Design”, 8th Edition, Tata McGraw-Hill, 2008.
3	

Reference Books

1	Merhyle F. Spotts, Terry E. Shoup and Lee E. Hornberger, “Design of Machine Elements” 8th Edition, Printice Hall, 20
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2	Orthwein W, “Machine Component Design”, Jaico Publishing Co, 2003.
3	Prabhu. T.J., “Design of Transmission Elements”, Mani Offset, Chennai, 2000.
4	Robert C. Juvinall and Kurt M. Marshek, “Fundamentals of Machine Design”, 4th Edition, Wiley, 2005
5	Sundararamamoorthy T. V, Shanmugam .N, “Machine Design”, Anuradha Publications, Chennai, 2003.

Website / URL References

1	https://nptel.ac.in/courses/112/106/112106137
2	
3	

Blooms Level

Level 1 (L1) : Remembering	Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing		Higher Order Thinking	Projects / Mini Projects
Level 2 (L2) : Understanding			Level 5 (L5) : Evaluating			
Level 3 (L3) : Applying			Level 6 (L6) : Creating			

Mapping syllabus with Bloom's Taxonomy LOT and HOT

Unit No	Unit Name	L1	L2	L3	L4	L5	L6	LOT	HOT	Total
Unit 1	DESIGN OF FLEXIBLE ELEMENTS	0	2	2	0	0	0	4	0	4
Unit 2	SPUR GEARS AND PARALLEL AXIS HELICAL GEARS	1	1	4	0	0	0	6	0	6
Unit 3	BEVEL, WORM AND CROSS HELICAL GEARS	2	3	3	0	0	0	8	0	8
Unit 4	GEAR BOXES	1	2	4	0	0	0	7	0	7
Unit 5	CAMS, CLUTCHES AND BRAKES	3	3	4	0	0	0	10	0	10
Total		7	11	17	0	0	0	35	0	35
Total Percentage		20	31.43	48.5714	0	0	0	100	0	100

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	3										2	1
CO2	1	3	3										2	1
CO3	1	2	3										2	1
CO4	1	2	3										2	1
CO5	1	2	3										2	1
CO6														
Avg	1	2	3										2	1

Justification for CO-PO mapping

CO1	Apply the knowledge of mathematics science and engineering fundamentals is required (PO1), identify the given engineering problems of mathematics is required for solving (PO2), Design solutions for complex engineering problems and design system component (PO3)
CO2	Apply the knowledge of mathematics science and engineering fundamentals is required (PO1), identify the given engineering problems of mathematics is required for solving (PO2), Design solutions for complex engineering problems and design system component (PO3)

CO3	Apply the knowledge of mathematics science and engineering fundamentals is required (PO1), identify the given engineering problems of mathematics is required for solving (PO2), Design solutions for complex engineering problems and design system component (PO3)				
CO4	Apply the knowledge of mathematics science and engineering fundamentals is required (PO1), identify the given engineering problems of mathematics is required for solving (PO2), Design solutions for complex engineering problems and design system component (PO3)				
CO5	Apply the knowledge of mathematics science and engineering fundamentals is required (PO1), identify the given engineering problems of mathematics is required for solving (PO2), Design solutions for complex engineering problems and design system component (PO3)				
3	High level	2	Moderate level	1	Low level
Name & Sign of Faculty Incharge : D SAKTHIVEL					
Name & Sign of Subject Expert :					
Head of the Department :					

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