

Course Code	Course Name	Credits
MEC701	Design of Mechanical System	04

Objectives:

1. To familiarize with the concept of system and methodology of system design
2. To study system design of various systems such as Gear box, snatch block, belt conveyors, I. C. engine system and pumps

Outcomes: Learner will be able to...

1. Apply the concept of system design.
2. Select appropriate gears for power transmission on the basis of given load and speed
3. Design material handling systems such as hoisting mechanism of EOT crane,
4. Design belt conveyor systems
5. Design engine components such as cylinder, piston, connecting rod and crankshaft
6. Design pumps for the given applications

Module	Contents	Hours
1.	Methodology & Morphology of design, Optimum design, system concepts in design.	04
2.	Design of Transmission Gear Box:	12
	Single stage and Two stage Gear box with fixed ratio consisting of Design of spur, helical, bevel and worm and wormwheel gear pairs, Gear box housing layout and housing design.	
3.	Design of Hoisting Mechanism:	10
	Design of Snatch Block Assembly including Rope Selection, Sheave, Hook, Bearing for hook, cross piece, Axle for sheave and shackle plate, Design of rope drum, selection motor with transmission system.	
4.	Design of Belt Conveyors :	04
	Power requirement, selection of belt, design of tension take up unit, idler pulley	
5.	Engine Design (Petrol and Diesel):	10
	Design of cylinder, Piston with pin and rings, connecting rod & crank shaft with bearings	
6.	Design of Pump:	08
	5.1 Design of main components of gear pump.	
	1 Motor selection	
	2 Gear design	
	3 Shaft design and bearing selection	
	4 Casing and bolt design	
	5 Sizing of design of suction and delivery pipe	
	5.2 Design of main components of Centrifugal Pump:	
1 Motor selection		

- 17 “Gear Design Handbook”, GitinMaitra, 2nd Edition, ISBN: 978-0074602379
- 18 “Design Data Book- Design of engine parts”,Khandare S.S & Kale A.V, 2nd Edition, ISBN: 978-9352654260

Links for online NPTEL/SWAYAM courses:

1. https://onlinecourses.nptel.ac.in/noc22_me62 - Gear And Gear Unit Design: Theory and Practice, IIT Kharagpur
2. <https://nptel.ac.in/courses/112/106/112106137/> - Machine Design-II, IIT Madras