INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (MECHANICAL ENGINEERING)
SEMESTER	4
COURSE TITLE	THEORY OF MACHINE
COURSE CODE	09ME2401
COURSE CREDITS	5

Objective:

1 This subject introduces in mechanical to understand the fundamental of the machines. In industries, the mechanical engineers/technicians have to manage functioning of equipment with proper planning, operation and maintenance of equipment. Such requirement needs knowledge and skills of various motion and force transforming mechanisms and devices, such as four bar mechanism, belt pulley, clutches, flywheel, etc. This course offers knowledge and skills in the area of mechanical equipment and devices to help in understanding of kinematics & dynamics of different equipment being used in industry.

Course Outcomes: After completion of this course, student will be able to:

1 To draw various inversions of mechanisms
2 To determine velocity and acceleration of different mechanisms
3 To construct different types of cam profile
4 To calculate loss of power due to friction in various machine elements
5 To solve problems on power transmission

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	2	0	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction** Definition of link, pairs, mechanisms, inversion, structure and machines, Various terminology associated to machines and mechanisms, Inversion of different mechanisms like four bar chain mechanism , slider crank mechanism, double slider crank mechanism, etc	8

Contents : Unit	Topics	Contact Hours
2	**Velocity and acceleration diagram** Basic concept of velocity and acceleration diagram, Relative velocity method for single slider crank mechanism and Four bar chain mechanism to find velocity and acceleration, Klein's construction method	7
3	**Cam and follower** Introduction, classification of cam and follower, Different types of motion and displacement, Construction of cam profile	6
4	**Friction** Concept and laws of friction, application of friction in various types of bearings- uniform wear and uniform pressure condition, Functions, construction and working of different types of clutches and breaks, Dynamometer	10
5	**Power transmission** Introduction, need and types of power transmission., Belt drive-types and terminology, Power transmission by flat belt drive - velocity ratios, slip, belt tensions, centrifugal tensions, maximum tension, condition for transmitting maximum power and initial tension (with derivations), Numerical of belt drive, Gear drives - types, gear train, Numericals and application of gear train	11
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Demonstration of various mechanism.** Demonstration of various mechanism.	2
2	**Problems of velocity and acceleration diagram of four bar mechanism** Problems of velocity and acceleration diagram of four bar mechanism	4
3	**Problems of velocity and acceleration diagram of slider crank mechanism** Problems of velocity and acceleration diagram of slider crank mechanism	2
4	**Problems based on Klein's construction method** Problems based on Klein's construction method	2
5	**Construction of cam profile with knife edge follower** Construction of cam profile with knife edge follower	2
6	**Construction of cam profile with roller and flat face follower** Construction of cam profile with roller and flat face follower	4
7	**Problems based on friction** Problems based on friction	2
8	**Demonstration and numerical of various breaks** Demonstration and numerical of various breaks	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
9	**Demonstration and numerical of various clutches** Demonstration and numerical of various clutches	2
10	**Demonstration of power transmission devices** Demonstration of power transmission devices	2
11	**Numerical of various belt drive** Numerical of various belt drive	2
12	**Numerical based on gear train.** Numerical based on gear train.	2
Total Hours		**28**

Textbook :

1   Theory Of Machines, S. B. Soni, Atul Prakashan, 2020

References:

1   Theory Of Machines, Theory Of Machines, S. S. RATTAN, Tata McGraw Hill Education Private Limited, 2009
2   Theory of Machines, Theory of Machines, R. S. Khurmi, S Chand Publication, 2020

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
26.00	37.00	37.00			

Instructional Method:

1   The course delivery method will depend upon the requirement of content and needof students. The teacher in addition to conventional teaching method by blackboard, may also use any of tools such as demonstration, role play, Quiz,brainstorming, MOOCs etc.
2   The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3   Students mayuse supplementary resources such as online videos, NPTEL videos,e-courses

Supplementary Resources:

1   https://edurev.in/t/186707/Displacement--Velocity-Acceleration-Analysis-of-Pl