INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (MECHANICAL ENGINEERING)**
SEMESTER	**2**
COURSE TITLE	**ELEMENTS OF MECHANICAL ENGINEERING**
COURSE CODE	**09ME2103**
COURSE CREDITS	**5**

Objective:

1 In the era of technology integration, it has become unavoidable to possess the basic knowledge of various engineering disciplines. Sometimes a technician has to know the implications and knowledge of other disciplines so as to conclude the solution of his/her own branch tasks. Hence students belonging to all branches are made to learn certain fundamental topics related to mechanical engineering so that they will have a minimum understanding of mechanical systems, equipment and process.
Main goal of this subject is to develop understanding of basic principles of Mechanical Engineering is required in various field of engineering.

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

1 To understand the fundamentals of mechanical components
2 Demonstrate mechanism of power generation and conversion in automobiles
3 Demonstrate knowledge of machine tools for metal cutting
4 Employ knowledge of joining metals permanently or temporarily with application of heat
5 Apply knowledge in steam and its properties
6 To understand and appreciate significance of mechanical engineering in different fields of engineering

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	2	50	30	20	25	25

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Contents : Unit	Topics	Contact Hours
1	**INTRODUCTION** Introduction and use of mechanical engineering, Identification criteria, major types, specifications and uses of general items(bolts, nuts, washers, bearings, bushes, belts, springs, levers, couplings, brakes, screws, rivets, keys, o' rings, oil seals, gears, pulleys, shafts, axles, etc.), Pipes and pipe fittings; Types, specifications and uses of spanners (such as fix, ring, box, pipe, allen, adjustable, etc.), hand tools (such as pliers, screw drivers, saws, hammers, chisels, cutters, planes, etc.), power tools(drill, chipper, etc.)	7
2	**POWER TRANSMISSION** Belt drive, Chain drive, Rope drive, Gear drive, Causes and remedies of general accidents in power transmission, Safety norms to be followed in power transmission	10
3	**MATERIAL PROCESSING** Welding-types, concept, working, applications and precautions, Brazing and Soldering-general set up and applications, Gas cutting-working setup, applications and precautions, Casting-general process and applications, Sheet metal forming and cutting operations-concept and application, Basic machine tools	12
4	**STEAM GENERATION** Steam generation process and steam properties, Steam boilers-classifications, working, accessories and mountings, applications, regulation and safety requirements, Prime movers-meaning, classification and working, steam turbines (working), gas turbine (types and applications)	9
5	**POWER PRODUCING DEVICES AND POWER CONSUMING DEVICES** Introduction, Classification, Working - petrol engine, diesel engine and gas engine, Performance parameters, Main parts and their functions, Applications, Common troubles and remedies, Concept of refrigeration, Definition of tones, Selection parameter of air conditioner, Concept of refrigerant	8
6	**HYDRAULIC AND PNEUMATIC DEVICES** Properties of fluids; Concept of fluid flow, Pump-types, working of centrifugal and reciprocating pumps, performance parameters, main parts of pumps and their functions, common troubles and remedies, Water turbines-working principle, types, applications, common troubles and remedies, Air compressor-working principle, types, performance parameters and applications	10
Total Hours		**56**

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Demonstration various mechanical items, hand tools and power tools** Demonstration various mechanical items, hand tools and power tools	2
2	**Demonstration of belt drive and chain drive power transmission methods** Demonstration of belt drive and chain drive power transmission methods	2
3	**Demonstration of rope drive and gear drive power transmission methods** Demonstration of rope drive and gear drive power transmission methods	2
4	**To Study about different metal joining processes** To Study about different metal joining processes	2
5	**Demonstration on lathe machine** Demonstration on lathe machine	2
6	**Demonstration of construction and working of boiler** Demonstration of construction and working of boiler	2
7	**To Study about boiler mountings and boiler accessories** To Study about boiler mountings and boiler accessories	2
8	**Study construction and working of petrol IC engine** Study construction and working of petrol IC engine	2
9	**Study construction and working of diesel IC engine** Study construction and working of diesel IC engine	2
10	**Study construction and working of different types of pumps** Study construction and working of different types of pumps	2
11	**Study construction and working of different types of air compressors** Study construction and working of different types of air compressors	2
12	**Demonstration of refrigerating device** Demonstration of refrigerating device	2
Total Hours		**24**

Textbook :

1 FUNDAMENTAL OF MECHANICAL ENGINEERING, R. B. Varia, Atul Prakashan, 2017

References:

1 Elements of Mechanical Engineering, Elements of Mechanical Engineering, Nikunj V. Rachchh and Chirag J. Parekh, McGraw Hill Education, 2018

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**
35.00	40.00	25.00			

Instructional Method:

1 Lectures and Discussion

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

Supplementary Resources:

1 http://nptel.iitm.ac.in

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