INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (MECHANICAL ENGINEERING)**
SEMESTER	**4**
COURSE TITLE	**PLANT MAINTENANCE& SAFETY**
COURSE CODE	**09ME2404**
COURSE CREDITS	**4**

Objective:

1 To ensure both quality and quantity of the production, equipment, maintenance in industries is very important. If equipment maintenance is not done properly, Industry's ability to survive and progress reduces. Improper maintenance is not done, industries remain busy in everyday firefighting and repair the breakdowns and production management becomes very unsafe. This course provides knowledge about corrosion, wear, lubrication and preventive maintenance; important provisions of factory act, decision tree to diagnose faults, alignment of equipment etc. This course also provides basic information and skills regarding maintenance problems along with their causes and remedies in industries.

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

1 Understand about fundamental of maintenance.
2 Develop decision tree for fault tracing in mechanical component
3 Carry out plant periodic maintenance and preventive maintenance
4 To study various type of wear and their prevention
5 Get aware about industrial safety norms as per act 1948

Pre-requisite of course:NA

Teaching and Examination Scheme

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

Contents : Unit	Topics	Contact Hours
1	**FUNDAMENTALS OFMAINTENANCE ENGINEERING** Aim - maintenance engineering, Primary, secondary functions , Responsibility of maintenance department; Types of maintenance, Tools used for maintenance, Maintenance and replacement cost, Equipment service life	4

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Contents : Unit	Topics	Contact Hours
2	**WEAR ANDCORROSION ANDTHEIR PREVENTION** Types, causes and effects of wear, Reduction methods of wear, Types of lubrications, Lubrication methods, General sketch, working and applications of Lubrication method, Principle, factors affecting the corrosion, Types of corrosion, Corrosion prevention methods	8
3	**FAULT TRACING** Concept and importance of Fault tracing, concept, need and applications of Decision tree, Sequence for fault finding, Activities as decision tree with examples, Types of faults, General causes in machine tools	6
4	**PERIODIC AND PREVENTIVE MAINTENANCE** Concept and need of Periodic inspection, Degreasing, cleaning and repairing schemes, Overhauling of mechanical components and electrical motor, Common troubles of Electric motor with remedies, Repair complexities along with its use, steps, need of Preventive maintenance, Advantages of Preventive maintenance, Plan preventive maintenance of major mechanical systems, concept and importance of Repair cycle	10
5	**INDUSTRIAL SAFETY** Causes of Accident, types, results and control of accident, Types of hazards with causes and preventive steps/procedure, Salient points of Factories act 1948, Safety colour codes for Industrial safety , Fire prevention methods, firefighting equipment	5
6	**RECOVERY, RECONDITIONING AND RETROFITTING** Definition, Methods of recovery along with applications, Selection criteria of recovery methods, Features and advantages of Reconditioning process, Concept, need and applications of Retrofitting	5
7	**INSTALLATION, ERECTION AND COMMISSIONING OF EQUIPMENTS** Foundation - Design and planning of equipment, Equipment Erection and commissioning, Alignment of Equipments, Testing of equipment	4
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Demonstrate use of various types of equipment/tools used for maintenance** Demonstrate use of various types of equipment/tools used for maintenance	2
2	**Prepare wear chart for a given machine component** Prepare wear chart for a given machine component	2

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
3	**Prepare corrosion chart for a given machine component** Prepare corrosion chart for a given machine component	2
4	**Develop decision tree for location of fault for given mechanical machine** Develop decision tree for location of fault for given mechanical machine	2
5	**Maintenance of mechanical based Equipment/Device/Machine** Maintenance of mechanical based Equipment/Device/Machine	2
6	**Prepare a preventive maintenance schedule of any workshop having mechanical machines/devices** Prepare a preventive maintenance schedule of any workshop having mechanical machines/devices	2
7	**Demonstrate use of firefighting equipment** Demonstrate use of firefighting equipment	2
8	**Demonstrate use of safety related equipment** Demonstrate use of safety related equipment	2
9	**Prepare a test chart for lathe machine** Prepare a test chart for lathe machine	2
10	**Prepare a test chart for milling machine** Prepare a test chart for milling machine	2
11	**Prepare a test chart for shaper machine** Prepare a test chart for shaper machine	2
12	**Mini project** Mini project	2
Total Hours		**24**

Textbook :

1 Plant Maintenance & Safety , K.K.Patel, Atul prakashan , 2019

2 Plant Maintenance & Safety(Gujarati), K.K.Patel, Atul prakashan, 2019

References:

1 Maintenance Engineering, Maintenance Engineering, H. P. Garg, 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
28.00	35.00	37.00			

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Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, 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. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses

Supplementary Resources:

1. https://www.youtube.com/results?search_query=plant+maintenance+and+safety+video

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