

<b>Name of Faculty</b>	:	Faculty of Engineering & Technology
<b>Name of Program</b>	:	Master of Technology (M. Tech)
<b>Course Code</b>	:	1MEE05
<b>Course Title</b>	:	Industrial Safety
<b>Type of Course</b>	:	Open Elective (OE)
<b>Year of Introduction</b>	:	2023-24

<b>Prerequisite</b>	:	-
<b>Course Objective</b>	:	Safety is major issue in any industry; awareness about safety helps students from any major accidents, Different rules regulation of safety helps students apply it in industry for performance and productivity improvements. Knowledge of Maintenance, its type and application give better work environments and helps industry from major shutdown. Different maintenance tools and techniques for different situation and industry equipment's helps students to apply it in real life industry problems.
<b>Course Outcomes</b>	:	At the end of this course, students will be able to:
	CO1	Understand the concepts of Industrial safety and Engineering maintenance
	CO2	Apply different tools and techniques for engineering maintenance.
	CO3	Implement fault tracing concepts and decision trees for different equipment.
	CO4	Analyse periodic and preventive maintenance.
	CO5	Evaluate different maintenance and industrial safety techniques.

### Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	2	0	4	70	30	30	20	150

*Legends: L-Lecture; T-Tutorial/Teacher Guided Theory Practice; P - Practical, C - Credit, SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	<b>Unit-I: Industrial Safety:</b> Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc., Safety colour codes. Fire prevention and firefighting, equipment and methods	10	20%	CO1
2	<b>Unit-II: Fundamentals of Maintenance Engineering:</b> Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.	6	15%	CO1 CO2
3	<b>Unit-III: Wear and Corrosion and their Prevention:</b> Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods	10	20%	CO2
4	<b>Unit-IV: Fault Tracing:</b> Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault-finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, i. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine	12	30%	CO3

	tools and their general causes.			
5	<b>Unit-V: Periodic and Preventive Maintenance:</b> Periodic inspection concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: i. tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance	6	15%	CO4 CO5

#### Suggested Distribution of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
<b>Weightage</b>	<b>10</b>	<b>30</b>	<b>40</b>	<b>10</b>	<b>10</b>	<b>0</b>

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

#### Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Introduction to Industrial Safety	4
2	Government laws and act for health and safety	4
3	Fundamentals of Maintenance Engineering	4
4	Wear and Corrosion	4
5	Prevention of Wear and Corrosion	4
6	Periodic Maintenance	4
7	Preventive Maintenance	4

#### Suggested Learning Websites

Sr. No.	Name of Website
1	<a href="https://www.osha.gov/">https://www.osha.gov/</a>
2	<a href="https://www.nsc.org/">https://www.nsc.org/</a>
3	<a href="https://www.hse.gov.uk/">https://www.hse.gov.uk/</a>



**Reference Books**

Sr. No.	Name of Reference Books
1	Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services
2	Maintenance Engineering, H. P. Garg, S. Chand and Company.
3	Pump-Hydraulic Compressors, Audels, McGraw Hill Publication
4	Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London