

COURSE CODE 1153ME106	MAINTENANCE ENGINEERING AND CONDITION MONITORING	L	T	P	C
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1. Preamble

To provide knowledge and understanding of maintenance functions in Industries and also to introduce various concepts for condition monitoring of machineries for effective use of resources.

2. Prerequisite

Basic Mechanical Engineering

3. Links to other courses

Project Work

4. Course Educational Objectives

Students completing this course are expected

- To understand the importance of maintenance function, costs involved and benefits.
- To impart knowledge on wear and its effects
- To assess condition monitoring techniques and their advantages for effective usage

5. Course Outcomes

Upon the successful completion of this course, the learners will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Understand and remember various types of maintenance functions.	K2
CO2	Understand and recall causes of wear and their effects.	K2
CO3	Use various networking models for the given distance network.	K2
CO4	Understand and recall principles of condition monitoring.	K2
CO5	Work with the condition monitoring equipments.	K2

(K3-Apply)

6. Correlation of Cos with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H						L					L	M	
CO2	H						L					L	M	
CO3	H						L					L	M	
CO4	H						L					L	M	
CO5	H						L					L	M	

H-High; M-Medium: L-Low

7. Course Content

UNIT I FUNDAMENTALS OF MAINTENANCE FUNCTION

L- 9

Introduction – Maintenance function and its importance in material and energy conservation – inventory control, productivity, safety , pollution control etc. Safety regulations , pollution problems , human reliability , Total productive maintenance (TPM) – environmental issues in maintenance – ISO 9000.

UNIT II MAINTENANCE MANAGEMENT

L- 9

Types of maintenance strategies , planned and unplanned maintenance, breakdown, preventive and predictive maintenance their comparison , Advantages and disadvantages.Limitation , computer aided maintenance , maintenance scheduling , spare parts management , inventory control, organization of maintenance department .

UNIT III TRIBOLOGY IN MAINTENANCE

L- 9

Meaning – friction wear and lubrication, friction and wear mechanisms, prevention of wear, types of lubrication mechanism, lubrication process. Lubricants – types, general and special purpose, additives, testing of lubricants , degradation of lubricants , seal and packaging.

UNIT IV CONDITION MONITORING

L- 9

Condition based maintenance, Signature analysis, oil analysis, vibration ,noise and thermal signatures, online and offline techniques , instrumentation and equipment used in machine health monitoring , instrumentation in maintenance signal processing , data acquisition ,analysis and application of intelligent systems , database design .

UNIT V CONDITION MONITORING EQUIPMENTS

L- 9

General equipment's and tools, special equipment's to monitor conditions of general machineries such as IC engines, compressors , High torque motors , generators , and other machineries. Automated condition monitoring for automobile systems , aero engines, Boilers , buildings and structural systems.

TOTAL: 45 Periods

8. Text Books

1. Gopalakrishnan , "Maintenance and spare parts Management " , 9th Edition, Prentice Hall of India, New Delhi, 2013
2. Kiran , "Maintenance Management " , PHI , , 2014.

9. References

1. Higgins , Maintenance Engineering , 8th Edition, McGraw Hill, 2010.
2. S.K.Shrivastav, Industrial Maintenance Management , S.K Chand Publishers , 2013
3. CNR Rao, "Handbook of condition monitoring " , Prentice hall India Publishers , 2012