

NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY, SCHOOL OF ENGINEERING
B Tech in Mechanical Engineering

(Department Elective)

L	T	P	C
2	0	2	3

Course Code	2MEDE55
Course Title	Maintenance Engineering and Asset Management

Course Outcomes (CO):

At the end of the course, students will be able to –

1. compare various maintenance systems and strategies,
2. propose the methodology to apply concepts of reliability, failure and trend analyses,
3. develop the system of maintenance planning and scheduling,
4. show the role of condition monitoring techniques for industrial applications.

Syllabus
30

Teaching Hours:

UNIT I	<p>Introduction</p> <p>Importance of maintenance, Maintenance strategies and systems planned and unplanned maintenance, breakdown maintenance/corrective maintenance, preventive maintenance and predictive maintenance, procedures and selection, preventive maintenance, Predictive maintenance, planning, scheduling and control, condition based maintenance systems.</p> <p>Total Productive Maintenance (TPM) Introduction, goals, concepts of TPM, pillars of TPM, Basic systems of TPM, Procedure and steps of TPM, Benefits of TPM.</p> <p>Selection of maintenance systems using failure mode effects and criticality analysis.</p>	06 hours
UNIT II	<p>Reliability Oriented Maintenance System</p> <p>Failure patterns, Machine life cycle – bath tub curve, types of failures, methods of trend analysis.</p> <p>Failure probability, reliability system, modular design, redundancy, terms used in reliability calculations like mean time between failure, mean time to failure mean time to repair, availability and maintainability, reliability oriented maintenance models.</p>	06 hours
UNIT III	<p>Condition Monitoring</p> <p>Fault diagnosis and prognosis, types of Condition based maintenance system, Condition monitoring using noise, vibration and heat (NVH).</p> <p>Basics of machinery vibration for condition monitoring, Rotordynamics, vibration parameters, computer aided data acquisition systems, signal processing techniques for</p>	13 hours

fault finding in machine, time and frequency domain analysis, instrumentation for condition monitoring.

Other advanced condition monitoring techniques like noise, thermography, oil analysis, wear debris analysis, etc.

UNIT IV Maintenance planning and scheduling

05 hours

Maintenance job planning and scheduling techniques, replacement analysis

Self - Study The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 08 experiments/exercise to be incorporated.

Suggested Readings:

1. N V S Raju, Plant Maintenance and Reliability Engineering, Cengage Learning
2. A R Mohanty, Machinery Condition Monitoring Principles and Practices, CRC Press
3. Cornelius Scheffer and Paresh Girdhar, Practical Machinery Vibration analysis and Predictive Maintenance, Elsevier

L=Lecture T= Tutorial P=Practical, C=Credit

w.e.f. academic year 2020-21 and onwards