

Branch Name:	Mechanical Engineering
Semester/Year:	Semester VI / Third Year
Subject Title:	Plant Maintenance and Safety Engineering
Subject Code:	1ET1010607
Pre-requisite:	Manufacturing Processes

Course Objectives:

1. This course intends to give the exposure of various methods of plant maintenance and safety engineering which is an important manufacturing route to fabricate bulk storage and processing equipment's in industries for engineering students.
2. The subject focuses on knowledge and understanding of various material handling, plant maintenance and industrial acts and safety.
3. This course also provides basic knowledge and skills regarding maintenance problems, their causes and remedies in industries.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	01	00	04	70	30	-	20	120

Subject Contents			
Sr. No	Topic	Total Hours	Weightage (%)
1	Concept of Maintenance Engineering Need for maintenance, Primary and secondary functions and responsibility of maintenance department, Modern maintenance, Problem and maintenance strategy for the 21 st century, Engineering maintenance objectives and maintenance in equipment life cycle, Terms and Definitions.	5	10
2	Plant Maintenance Role of maintenance management, Organization and systems of maintenance management, Different types of maintenance-their purpose and features, Periodic inspection-concept and need, Total productive maintenance, Pillars of TPM. Inventory Control in Maintenance Inventory control objectives and basic inventory decisions, ABC inventory control method, Inventory control models-Two-Bin inventory control and safety stock, Spares determination factors, spares calculation methods.	10	25

3	Quality and Safety in Maintenance Needs for quality maintenance processes, Maintenance work quality, Use of quality control charts in maintenance, Work sampling, Post maintenance testing, Reasons for safety problems in maintenance, Guidelines to improve safety in maintenance work, Safety officer's role in maintenance work, Protection of maintenance workers. Maintenance costing: Reasons for maintenance costing, Maintenance budget preparation methods and steps, Maintenance labor cost estimation, Material cost estimation, Equipment life cycle maintenance cost estimation and Maintenance cost estimation models.	10	25
4	Wear and Corrosion Wear- types, causes and effects, Wear reduction methods, Lubricants-types and applications, Lubrication methods–Screw down grease cup, Pressure grease gun, Splash lubrication, Gravity lubrication, Wick feed lubrication, Side feed lubrication, Ring lubrication-General sketch, working and applications.	6	15
5	Industrial Acts and Safety Background of industrial hazards and safety, Safety equipment's, Effect of accidents, their causes and prevention measures, 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, Safety colour codes, Fire prevention and fire fighting equipment and methods, Collective bargaining, National safety council.	10	25

Course Outcomes:

The student will be able to

1. Indicate various plant engineering and safety aspects.
2. Identify and determine plant maintenance.
3. Identify and determine industrial acts and safety.

List of Reference Books:

1. Gupta, A. K. Reliability, maintenance and safety engineering. Laxmi Publications, Ltd., 2009.
2. Deshmukh, L. M. Industrial Safety Management. Tata McGraw-Hill Education, 2005.
3. Mishra, R. C., and K. Pathak. Maintenance engineering and management. PHI Learning Pvt. Ltd., 2012.
4. Dhillon, Balbir S. Engineering maintenance: a modern approach. CRC press, 2002.
5. Mobley, Keith, Lindley Higgins, and Darrin Wikoff. Maintenance engineering handbook. McGraw-Hill Prof Med/Tech, 2008.
6. Ait-Kadi, Daoud, et al. Handbook of maintenance management and engineering. Ed. Mohamed Ben-Daya. Vol. 7. Springer London, 2009.

List of Tutorial:

1. To Study about concept of maintenance engineering.
2. To Study about plant maintenance.
3. To Study about inventory control in maintenance.
4. To Study about quality and safety in maintenance.
5. To Study about wear and corrosion and their prevention.

6. To Study about industrial act and safety.
7. Industrial visit with student's report.

E-Resources:

1. <http://nptel.ac.in/courses/112107143/40>