

**GUJARAT TECHNOLOGICAL UNIVERSITY****Syllabus for Bachelor of Vocation (B.Voc), 5th Semester****Branch: Production Technology****Subject Name: Reliability, Maintenance & Safety Engineering****Subject Code: 1150301****With effective
from academic
year 2018-19****Type of course:** Engineering Science**Prerequisite:** Zeal to learn the subject

Rationale: Maintenance of equipment in industries is very critical issue to ensure quality and quantity of production. Industries are not able to survive and progress if proper maintenance of equipment is not done. In the absence of proper maintenance, industries are busy in every day fire fighting to repair the breakdowns and manage production in very unsafe manner also the requirement of safety in engineering is also covered.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

Sr. No.	Topic	No. of Hours	Weightage %
01	Reliability Definition, reliability function, Mean failure rate, mean time to failure (MTTF), mean time between failures (MTBF), hazard rate curve. Bathtub curve, Conditional Reliability	5	10
02	Constant Failure rate model Exponential Reliability function, Failure Modes, CFR model, memory lessness, System reliability: Series, parallel, mixed & complex configuration; Reliability improvement.	6	20
03	Design for reliability Reliability specifications and system Measurements, System Effectiveness, redundancy, Classification of Redundancy, Introduction of failure mode and effect analysis (FMEA)	8	25
04	Maintainability Analysis of Downtime, repair time distribution, stochastic point processes.	5	20
05	Safety engineering Fundamentals of industrial safety, Safety policy and safety terminology, Different types of safety systems and equipments, Safety targets, standards, objectives	8	25

Distribution of marks weightage for cognitive level:

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	-	-	-



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

Reference Books:

1. Reliability, Maintenance and Safety Engineering by A. K. Gupta, Laxmi Publications (P) Ltd
2. Textbook of Reliability and Maintenance Engineering by S Maheshwarkar, katson books.
3. Maintenance Engineering by Sushil Kumar Srivastava, S. chand Publications.
4. Reliability Engineering by S S Rao, Pearson publications

Course Outcome:

Sr. No.	CO statement	Marks % weightage
CO 1	To understand Reliability concepts	10
CO 2	To understand the modern practices in maintenance	20
CO 3	Understand the concept of design for quality.	25
CO 4	Understand the principles, functions and practices adapted in industry for the successful management of maintenance activities	20
CO 5	Understand safety engineering aspects in industry.	25

List of Open Source Software/learning website:

<https://nptel.ac.in>,