

GOVERNMENT OF GUJARAT  
**LUKHDHIRJI ENGINEERING COLLEGE, MORBI**  
 Mechanical Engineering Department

**Course Teaching-Learning-Evaluation Strategy**

Subject: **Quality and Reliability Engineering (3171929)**

Academic Year:2023-24

(Even) Class: 7<sup>th</sup> Semester(Div: A & B)

Type of course: NA

Faculties: A B KHANT, A N DAVE

**Course Outcomes (Cos)**

CO Nos.	CO statement	Weightage (Marks %)
1.	Interpret Quality and Total quality management	30
2.	Make use of design of experiments, concepts of just in time and quality management.	25
3.	Illustrate Total Productive maintenance and ISO.	20
4.	Utilize knowledge of contemporary trends in quality engineering and ReliabilityEngineering in industry.	25

**Teaching and Examination Scheme:**

Teaching Scheme			credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE(E)	PA(M)	ESE(V)	PA(I)	
3	0	2	4	70	30	30	20	150

**Distribution of marks weightage for cognitive level**

Bloom's Taxonomy for Cognitive Domain	Recall	Comprehension	Application	Analysis	Evaluate	Create
Marks% weightage	10	15	25	20	15	15
70 marks	7	10.5	17	14	10.5	11
30 marks	3	4.5	7.5	6	4.5	0

**Course Evaluation Plan**

	Direct Assessment				
	Internal Evaluation			External(Uni.) Evaluation	
	Mid Sem Exam (continue evaluation) (Theory)	Assignment/ Quiz	Lab. Work	Practical/ Viva (IF)	Uni. Exam (Theory)
Max. Marks	30	20	20	30	70
Weightage	30%			70%	
CO1	10	10	4	7.5	17.5
CO2	10	10	2	7.5	17.5
CO3	10	10	9	7.5	17.5
CO4	0	10	5	7.5	17.5

**Course Content with lecture plan:**

Sr. No.	Content	Course outcome(s)	Lecture(s) require	Faculty
1	<b>Introduction to Quality:</b> Concept, Different Definitions and Dimensions, Inspection, Quality Control, Quality Assurance and Quality Management, Quality as Winning Strategy, Views of different Quality Gurus.	CO1	07	AND
2	<b>Total Quality Management (TQM):</b> Introduction, Definitions and Principles of Operation, Tools and Techniques, such as, Quality Circles, 5 S Practice, Total Quality Control (TQC), Total Employee Involvement (TEI), Problem Solving Process, Quality Function Deployment (QFD), Failure Mode and Effect analysis (FMEA), Fault Tree Analysis (FTA), Kizen, Poka-Yoke, 7QC Tools, PDCA Cycle, 7 New Quality Improvement Tools, TQM Implementation and Limitations.	CO1	04	ABK
3	<b>Introduction to Design of Experiments:</b> Introduction, Methods, Taguchi approach, Achieving robust design, Steps in experimental design.	CO2	04	ABK
4	<b>Just –in –Time, Quality Management, Total Productive Maintenance (TPM) and ISO:</b> Introduction to JIT production system, KANBAN system, JIT and Quality Production, TPM: Content, Methods and Advantages ISO 9000, ISO 14000 and QS 9000:	CO2,CO3	03	AND
5	<b>Contemporary Trends:</b> Concurrent Engineering, Lean Manufacturing, Agile Manufacturing, World Class Manufacturing, Cost of Quality (COQ) system, Bench Marking, Business Process Re-engineering, Six Sigma: Basic Concept, Principle, Methodology, Implementation, Scope, Advantages and Limitation of all as applicable.	CO4	06	AND
6	<b>Reliability:</b> Introduction, Concepts of Reliability and failure: Reliability, Failure, Failure mechanism, failure severity and consequences. Reliability basic functions: Probability density function, cumulative function and reliability function, conditional distribution and residual life, failure rate and cumulative hazard functions, relation between reliability basic functions. Life characteristics: Measure of life time, Dispersion of lifetime, Skewness and kurtosis of life dispersion. Reliability of repairable system: Failure repair process, Reliability measure, Reliability point process. Evolution of reliability over Product life cycle: Design reliability, Inherent reliability, Reliability at sale, field reliability.	CO4	10	AND

**Reference Books:**

1. Design of Machine Elements, V B Bhandari, 3/e, McGraw Hill.
2. A Textbook of Machine Design, P C Sharma and D K Aggarwal, S K Kataria & sons.
3. Shigley's Mechanical Engineering Design, R G Budnyas, J K Nisbett, McGraw Hill.
4. Fundamentals of Machine Component Design, R C Juvinall, 4/e, Wiley.
5. Machine Design: An Integrated Approach, R L Norton, Pearson
6. Strength of Materials, Part I & II, S Timoshenko, CBS publishers and distributors Pvt Ltd.
7. Strength of Materials, Bansal R K, Laxmi publication.
8. Strength of Materials, Patnaik S, Hopkins D, Elsevier.
9. Engineering Mechanics, Bansal R K, Laxmi Publication.

**Course articulation matrix correlation**

CO No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					2	2	2						
CO2	2					2	2	2						
CO3	2					2	2	2						
CO4	2					2	2	2						