



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Mechanical Engineering / Mechanical Engineering  
(CAD/CAM) / Mechatronics Engineering

Subject Code: DI04000281

Subject Name: Total Quality Management

<b>w. e. f. Academic Year:</b>	2025-26
<b>Semester:</b>	4 <sup>th</sup>
<b>Category of the Course:</b>	Professional Elective - I

<b>Prerequisite:</b>	Zeal to learn the subject.
<b>Rationale:</b>	Total quality management (TQM) is a term first used to describe a management approach to quality improvement. Since then, TQM's Purpose is meeting or exceeding customer expectations, so that the customers are delighted. So even if you do everything correctly but the customer doesn't like the quality of the product, the TQM approach will require revisiting. TQM, as a term, is not as widely used in many industries/organizations with most of the concepts, principles, and methodologies subsumed under the term quality management.

## Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Explain the fundamental strategies, concepts and objectives of TQM, including the role of quality circles.	U
02	Use tools and techniques to identify and improve quality-related problems.	A
03	Apply concepts of Cost of Quality and Taguchi's Loss Function, along with housekeeping practices.	A
04	Apply Quality Function Deployment (QFD) along with reliability and basic product/process design methods for quality improvement.	A
05	Interpret ISO-9000 and ISO-14000 requirements, documentation and auditing procedures to improve quality and reduce unnecessary costs.	U

\*Revised Bloom's Taxonomy (RBT)



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Program Name: Diploma Engineering**

**Level: Diploma**

**Branch: Mechanical Engineering / Mechanical Engineering  
(CAD/CAM) / Mechatronics Engineering**

**Subject Code: DI04000281**

**Subject Name: Total Quality Management**

### Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial / Practical	
			ESE(E)		PA(M)	PA(I)	ESE(V)	
3	0	2	4	70	30	20	30	150

### Course Content:

Unit No.	Content	No. of Hours	% of Weight age
1.	<b>Introduction to TQM:</b> 1.1 Meaning and definition of quality. 1.2 Strategies, concepts and objectives of Total Quality Management. 1.3 TQM in Indian industries. 1.4 Quality Circles: concepts, objectives, functions & benefits. 1.5 Training and implementation of Quality Circle members.	5	13
2.	<b>Tools and techniques for quality improvement:</b> 2.1 Seven traditional quality tools: Cause–Effect diagram, Check Sheet, Histogram, Pareto Chart, Scatter Diagram, Flow Chart, Control Chart. 2.2 Statistical Process Control (SPC): basics and process variation types. 2.3 Six Sigma introduction: concept, DMAIC overview (simple). 2.4 FMEA - Stages, Types 2.5 Total Productive Maintenance (TPM), Concepts, improvement needs – Performance measures	15	33
3.	<b>Cost of quality &amp; Taguchi method:</b> 3.1 Cost of Quality (COQ): prevention, appraisal, internal & external failure costs. 3.2 Taguchi's Quality Loss Function and its application in industries. 3.3 Housekeeping concepts for tool rooms, production shops & processing industries. 3.4 Role of COQ in productivity improvement.	10	20
4.	<b>Quality-based product &amp; process design:</b> 4.1 Quality Function Deployment (QFD): concepts, matrices, benefits. 4.2 Basic design concepts: design for manufacturability & maintainability.	12	24



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Mechanical Engineering / Mechanical Engineering  
(CAD/CAM) / Mechatronics Engineering

Subject Code: DI04000281

Subject Name: Total Quality Management

	4.3 Product and process design for quality improvement. 4.4 Simple case studies on QFD and reliability.		
5.	<b>Quality assurance and audits:</b> 5.1 ISO Standards: ISO-9000; scope, application, terms & definitions. Documentation requirements, Quality Manual, Process approach, Steps for ISO certification, ISO-14000 5.2 Quality Audit: Purpose, procedure, and types of audits.	3	10
<b>Total</b>		<b>45</b>	<b>100</b>

## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
14	28	28	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

## References/Suggested Learning Resources:

### (a) Books:

Sr. No.	Title of Book	Author	Publication
1.	TQM – Text with Cases	Oakland, J.S.	Butterworth – Heinemann Ltd., Oxford
2.	Total Quality Management	Dale H. Besterfield, et al.	Pearson Education Asia, Delhi
3.	Total Quality Management	Suganthi, L. and Anand Samuel,	Prentice Hall India Learning Private Limited, New Delhi
4.	Total Quality Management – Text and Cases	Janakiraman, B. and Gopal, R.K.	Prentice Hall India Learning Private Limited, New Delhi

### (b) Open-source software and website:

1. <https://www.sciencedirect.com/science/article/pii/S2214716017301288> (TQM in India)
2. <https://nptel.ac.in/courses/110104080> (IIT Kanpur, NPTEL Course on TQM)
3. <https://secwww.jhuapl.edu/techdigest/content/techdigest/pdf/V13-N02/13-02-Ali.pdf> (SPC)
4. <https://www.cms.gov/medicare/provider-enrollment-andcertification/qapi/downloads/guidanceforfmea.pdf> (FMEA)
5. <https://www.youtube.com/watch?v=rcrF7zV0qOQ> (TPM)
6. <https://www.youtube.com/watch?v=63deevMWjgs&pp=ygUUMy4xCUNvc3Qgb2YgUXV>



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Mechanical Engineering / Mechanical Engineering  
(CAD/CAM) / Mechatronics Engineering

Subject Code: DI04000281

Subject Name: Total Quality Management

hbG10eSA%3D (COQ)

7. <https://www.youtube.com/watch?v=X1KONQw02H8&pp=ygUDUUZE> (QFD)

## Suggested Course Practical List:

Sr. No.	Practical Outcomes (PrOs)	Approx. Hrs. Required
01	To study about the meaning, definitions, strategies, and objectives of quality and TQM in industries.	02
02	To study about Quality Circles, their formation, objectives, functions, and implementation steps.	04
03	To study about data collection using check sheets and preparation of Pareto charts for identifying major quality issues.	02
04	To study about plotting histograms and scatter diagrams and interpreting process variations.	02
05	To study about preparing a Cause-and-Effect (Ishikawa) diagram for identifying root causes of a problem.	02
06	To study about developing and interpreting flowcharts for manufacturing or service processes.	02
07	To study about constructing $\bar{X}$ and R control charts and analyzing process stability using SPC.	02
08	To study about the Six Sigma approach and apply a simple DMAIC example for process improvement.	02
09	To study about the components of COQ—prevention, appraisal, internal and external failure—and prepare a sample COQ report.	02
10	To study about Taguchi's Quality Loss Function and calculate loss for given process deviations.	04
11	To study about the development of a QFD House of Quality and perform Design/Process FMEA for selected products.	04
12	industrial visit & conduct a mock internal quality audit	-
<b>Total (Hours)</b>		<b>28</b>



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Mechanical Engineering / Mechanical Engineering  
(CAD/CAM) / Mechatronics Engineering

Subject Code: DI04000281

Subject Name: Total Quality Management

## Suggested Project List:

A representative list of projects is given here. The concerned faculty can add similar projects based on student activities (chart/presentation/report/model/animation):

1. Prepare a report on TQM in Indian industries.
2. Prepare a display chart/diagram of traditional quality tools.
3. Prepare a summary report of process variation types used for SPC.
4. Prepare presentation of case study of any industry who had got or in process of getting six sigma.
5. Case study on QFD for projects/tasks used in industry.
6. Application of TQM in any industry.
7. Case study on application of DFA & DFM in industry. (anyone concept).
8. Application ISO-9000/ ISO-14000 with quality audit in any industry.

## Suggested Activities for Students:

These are sample strategies that the course teacher can use to accelerate the attainment of the various outcomes in this course.

Sr. No.	Unit	UnitName	Activities
1	I	Introduction to TQM	Videos on topic and presentation of case study.
2	II	Tools and techniques for quality improvement	Videos on tools & techniques, live discussion at workshop place/industry, presentations.
3	III	Cost of quality & Taguchi method	Videos on COQ, live cases during industrial visits, power point presentations, research papers study.
4	IV	Quality-based product & process design	Videos on topics of QFD, DFA & DFM industrial visits, case study presentations.
5	V	Quality assurance and audits	Videos on topic and manuals / guidelines.

\* \* \* \* \*