



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Construction Engineering & Management

Course / Subject Code: ME01014051

Course / Subject Name : Quality control and Safety Management in Construction

w. e. f. Academic Year:	2024-25
Semester:	1 <sup>st</sup> Semester
Category of the Course:	PEC

<b>Prerequisite:</b>	Fundamentals of Construction methods
<b>Rationale:</b>	Quality control and safety management in construction are critical to ensuring project success and longevity. Effective quality control minimizes defects and ensures compliance with standards, while rigorous safety management prevents accidents and injuries. Both practices contribute to efficient project execution, cost savings, and enhanced reputation. Implementing these measures proactively is essential for achieving high standards and safeguarding personnel.

No	Program Outcomes
01	Engage in critical thinking and research to develop solutions to multifold real-world problems.
02	Communicate effectively with the engineering community at large level on complex design tasks & prepare best workouts and deliverables.
03	Demonstrate a high level of professionalism in handling multidisciplinary and complex Construction engineering and management problems.
04	Plan, Schedule, Manage and Control the complex construction and infrastructure projects in a sustainable local and global context.
05	Address technical, societal issues pertaining to Construction engineering & management by offering state of art and robust, sustainable and practical solutions while upholding high standards of ethics and professionalism.

### Course Outcome:

After Completion of the Course, Student will be able to:

No	Course Outcomes	RBT Level
1.	Understand different aspects of quality and related tools.	U, R
2.	Apply techniques of total quality assurance and quality control programme and cost implication.	A
3.	Understand importance of various aspects of safety during execution of construction activities.	U,R
4.	Apply to principles and theories of safety to construction projects.	A

\*Revised Bloom's Taxonomy (RBT)



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## 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/ CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<b>Quality Concerns in Construction</b> Need of quality control in construction, Factors influencing construction quality, Critical, major failure aspects, Issues of quality and quality control, quality management systems and method, responsibilities and authorities in quality assurance and quality control; architects, engineers, contractors, and consultants.	11	20
2.	<b>Quality Assurance, Control &amp; Management</b> Objectives of Quality assurance, Quality control and Quality management in context of construction, Quality policy, Consumer satisfaction, Taguchi's concept of quality, Codes and standards Documents, Inspection procedures, Total Quality Assurance / Quality Control programme and cost implication, Techniques and needs of QA/QC, Different aspects of quality, Regularity agent and compliance with standards and regulations, Inspection and testing, Defect management and resolution, Quality audits and reviews, Appraisals, Stability methods and tools, Reliability testing, Reliability prediction. Quality Assurance plan , Quality Management Guidelines ,Quality circles, ISO 9001:2015.	17	40
3.	<b>Safety Management in Construction</b> Injury And Accidents-Definitions-Unsafe Act ,Unsafe Condition Causes, Investigations And Prevention Of Accidents, Hazards, Type Of Industrial Hazards-Nature, Causes And Control Measures, Hazard Identifications And Control Techniques ,HAZOP, FMEA, FMECA, Cost of Construction Injuries, Legal Implications Safety Programmes - Introduction to the Concept of Safety- Need- Safety Provisions in the Factory Act, Laws	17	40



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	related to the Industrial Safety, Measurement Of Safety Performance, Safety Audit, Problem Areas In Construction Safety, Elements of an Effective and Safety Programme, Job site Safety assessment, Safety Meetings, Safety Incentives.  Safety Organization Safety Policy, Safety Record Keeping, Safety Culture, Safe Workers, Safety and First Line Supervisors, Safety and Middle Managers, Top Management Practices, Company Activities and Safety-Safety Personnel-Sub contractual obligation, Project Coordination and Safety Procedures.		
	<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
<b>20</b>	<b>40</b>	<b>30</b>	<b>10</b>	<b>--</b>	<b>--</b>

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

## References/Suggested Learning Resources

### Books:

1. Clarkson H. Oglesby, "Productivity Improvement in Construction ", McGraw Hill 1989.
2. Hinzie, J W (1997) Construction safety, Prentice Hall.
3. Hutchins. G., "ISO 9000 ", Viva Books, NewDelhi, 1993.
4. James, J.O Brien, "Construction Inspection Handbook - Quality Assurance and Quality Control ", Van Nostrand, New York, 1989.
5. Jimmy W.Hinze, "Construction Safety ", Prentice Hall Inc., 1997.
6. John L.Ashford, " The Management of Quality in Construction ", E & F.N Spon, New York, 1989.
7. Juran Frank, J.M. and Gryna, F.M. " Quality planning and Analysis ", Tata McGraw Hill, 1982.
8. Kwaku A., Tenah and Jose M.Guevera, "Fundamental of Construction Management and Organization ", Prentice Hall of India, 1995.
9. MacCollum, D V (2007) Construction safety engineering principles - designing and managing safer job sites, Tata McGraw Hill.
10. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, "Construction Safety and Health Management", Prentice Hall Inc., 2001.



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11. Rumane, A R (2011) Quality management in construction projects, CRC Press, T&F.
12. Rumane, A R (2013) Quality tools for managing construction projects, CRC Press, T&F.
13. Steven McCabe, "Quality Improvement Techniques in Construction ", Addison Wesley Longman Ltd., England, 1998.

## **Suggested Course Assignment /Tutorial List:**

### **Practical Work Assignments Based on :**

1. Site visit of construction project and preparation of report on safety provision, lack of safety
2. Preparation of Safety audit report
3. Site inspection and preparation of report on quality of construction
4. Construction Quality survey of existing high rise building or Row houses.
5. Preparation of report on salient features of ISO 9001:2015
6. Preparation of report on salient features of OSHA.
7. Preparation of Quality policy and safety policy for proposed high rise structure.

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