# GUJARAT TECHNOLOGICAL UNIVERSITY

**Program Name: Master of Engineering**
**Level: PG**
**Branch: Construction Engineering and Management**
**Subject Code: ME02014061**
**Subject Name: Construction Quality and Safety**

| | |
|---|---|
| w.e.f. Academic Year: | 2024-25 |
| Semester: | 2 |
| Category of the Course: | Professional Elective Course |

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| **Prerequisite:** | |
| **Rationale:** | Quality control ensures that the project meets specifications and standards, and is fit for its intended use. Construction is a high-risk industry, and accidents can result in injuries or fatalities. Safety management involves developing and implementing plans to prevent accidents. It is like a guarantee that the building meets safety standards by carrying out strict quality control, and that it can withstand various loads and environmental factors. This prevents potentially dangerous situations and liability issues. |

**Course Outcome:**

After Completion of the Course, Student will able to:

| No. | Course Outcomes |
|---|---|
| 01 | Explain the importance of quality and quality management methods in construction. |
| 02 | Develop quality assurance plan to meet required international and national quality standards. |
| 03 | Understand importance of various aspects of safety during execution of construction activities. |
| 04 | Learn the application of the principles and theories of safety to construction projects. |
| 05 | Identify the causes, investigations and prevention of accidents in construction job sites. |

**Teaching and Examination Scheme:**

| Teaching Scheme(in Hours) | | | Total Credits L+T+(PR/2) | Assessment Pattern and Marks | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Tutorial/Practical | | |
| L | T | PR | C | 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 | **Construction Organization**<br>Types of organization, inspection, control and enforcement, quality management systems and method, responsibilities and authorities in quality assurance and quality control; architects, engineers, contractors, and consultants, quality circle. | 08 | 27 |
| 2 | **Quality Assurance and Control**<br>Objectives, regularity agent; owner, design, contract and construction oriented objectives, methods/techniques and needs of QA/QC different aspects of quality, appraisals, factors influencing construction quality-critical, major failure aspects and failure mode analysis stability methods and tools, optimum design, reliability testing, reliability coefficient and reliability prediction selection of new materials, Statistical Methods for Quality Control | 08 | 27 |
| 3 | **Total Quality Management**<br>Road Map for TQM Implementation, Role of management in TQM, Quality improvement planning measurement, construction site implementation, six sigma in quality management. | 08 | 23 |
| 4 | **Safety And Health In Construction**<br>Safety and accidents in construction projects, theories of accident causation, health and illness related with construction works, cost of construction injuries, safety risk analysis and control, personal protective equipment, occupational and safety hazard assessment, legal implications, OSH Management System | 06 | 23 |
| 5 | **Safety Programme And Contractual Obligations**<br>Problem areas in construction safety, elements of an effective safety programme, job site safety assessment, safety meetings, and safety incentives Safety in construction contracts, substance abuse, safety record keeping. | 07 | |
| 6 | **Implementation of Safety on Construction Projects**<br>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 and workers compensation | 08 | |
| | **Total** | **45** | **100** |

**Suggested Specification Table with Marks (Theory):**

| Distribution of Theory Marks | | | | | |
|---|---|---|---|---|---|
| **R Level** | **U Level** | **A Level** | **N Level** | **E Level** | **C Level** |
| 20 | 30 | 30 | 10 | 10 | 0 |

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

**References/Suggested Learning Resources:**

1. Yang, K. and El-Haik, B S (2009). Design for Six Sigma, Tata McGraw Hill.
2. McCabe, S (1998) Quality improvement techniques in construction, Pearson Education.
3. Rumane, A R (2011) Quality management in construction projects, CRC Press, T&F.
4. Rumane, A R (2013) Quality tools for managing construction projects, CRC Press, T&F.
5. Levitt, R E and Samelson, Nancy Morse (1993) Construction Safety Management 2nd Edition, Wiley Publisher.
6. Goetsch. David L (2014) Occupational Safety and Health for Technologists, Engineers and Managers, 8th Edition, New Jersey: Pearson. Edu. Inc.
7. Hinzie, J W (1997) Construction safety, Prentice Hall.
8. MacCollum, D V (2007) Construction safety engineering principles - designing and managing safer job sites, Tata McGraw Hill.
9. Holt, A S J (2005) Principles of construction safety, Blackwell Publishers.

**Suggested Tutorials / Students Activities :**

1. Praparation of Construction Quality Implementation Plan for a Multi-storeyed Building
2. Plan to provide Training and Development to Construction Personnel
3. Discussion and Report on Quality Circle
4. Report on Statistical Methods for Quality Control
5. Report on Best Practices of achieving Quality Control on Construction Site
6. Understanding Hazards on Construction sites
7. Preparation of Safety Training Guide for Construction site
8. Visit to a Construction site of Multi storeyed building / Industrial Structure and study the Quality and Safety aspects

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