GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM
COURSE TITLE: CONSTRUCTION QUALITY CONTROL & MONITORING
(COURSE CODE: 3360602)

Diploma Programme in which this course is offered	Semester in which offered
Civil Engineering/Transportation Engineering	SIXTH

1. RATIONALE

Developing country like India where lots of infrastructure development is undergoing, knowledge and understanding of Quality Control & Monitoring in construction work is very important in order to achieve good quality product within the stipulated time period. For any civil construction work, day to day monitoring and inspection plays a very important role for durable and sustainable structure. Lots of infrastructure development works underway and construction resource material are depleting, under this circumstances, use of natural resources are very essential and necessary. That's why for diploma students, study of Green building concepts and quality control aspects are essential to perform their job, duties in the field efficiently.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop with different types of skills so that students are able to acquire following competencies:

- Supervise civil construction works effectively and efficiently.

3. COURSE OUTCOMES

The theory should be taught and exercises should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

i. Apply total quality management in civil construction.
ii. Check the quality in civil construction works.
iii. Identify the variations in quality of civil works.
iv. Use various standard codes in civil construction works.
v. Design energy efficient buildings.

4. TEACHINGAND EXAMINATION SCHEME

Teaching Scheme (InHours)			TotalCredits (L+T+P)	Examination Scheme				
				Theory Marks		PracticalMarks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
3	0	2	5	70	30	20	30	150

Legends: L- Lecture- Tutorial/TeacherGuidedStudentActivity;**P -** Practical; **C –**Credit;**ESE**-End Semester Examination;**PA**-ProgressiveAssessment.

5. COURSE DETAILS

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit-I **Total Quality Management (TQM) in Construction**	**1a. Able to explain TQM** **1b.Able to describe various quality checks.**	1.1 Concept of quality control, Quality assurance, Quality management. 1.2 Aims of TQM 1.3 Development and design Concept of TQM 1.4 Accuracy and precision in observation, reading theodolite, digital theodolite, total station, calibration, etc. 1.5 Accuracy in calculation, finding area, volume, etc.
Unit-II **Construction Quality Control Inspection Program**	**2a. Able to describe various aspects of QCIP.** **2b. Able to explain QC aspects of various construction activities.**	2.1 Duties, responsibilities, qualification of staff in organization. 2.2 Checklists for - Quality of Materials - Masonry - Plastering, - Concrete construction- Batching, Mixing, Transporting, Placing, Compaction, Finishing, Curing - Reinforcement Work - Formwork - Timber & steel construction, - Doors & windows, - Plumbing & drainage.
Unit-III **Statistical Quality Control& Monitoring**	**3a. Able to discuss stastical quality control methods.** **3b.Able to explain variables and attributes related to control charts.**	3.1 Statistical Quality Control 3.2 Quality Measurement: Attributes and Variables 3.3 Statistical Process Control (SPC) Methods 3.4 Control Charts for Attributes: p-Charts - Proportion Defective c-Charts - Number of Defects Per Unit 3.5 Control Charts for Variables 3.6 Other Types of Attribute-Sampling Plans 3.7 Acceptance Sampling

Unit-IV **Quality References**	**4a.Use various quality standard codes from its application point of views.**	4.1 Quality standards in construction related to Building materials and other inputs for construction processes. 4.2 Quality standards for Construction outputs, products and services. 4.3 Indian Standard Code (a) Methods of referring it (b) Use of IS for quality references 4.4 National Building code (NBC 2005) (a) Why to refer & How to refer (b) Methods of referring it & application. 4.5 Study of International Organization for Standardization (ISO) (a) ISO-9000, ISO14000 & certification procedures.
Unit-V **Sustainable Built Environment-Green Building**	**5a. Explain concepts and goals of green building.** **5b.Able to comprehend various aspects of energy efficient building.**	4.1 Green building – 4.2 Definition – Green Building, Green Construction, Sustainable building 4.3 Goals of Green building 4.4 Advantages and disadvantages 4.5 5.5 Strategies 4.6 Certification Agencies – GRIHA, LEED (Highlights & Criteria) 4.7 Life cycle assessment (LCA) 4.8 Siting and structure design efficiency 4.9 Energy efficiency 4.10 Water efficiency 4.11 Materials efficiency 4.12 Indoor environmental quality enhancement 4.13 Operations and maintenance optimization 4.14 Waste reduction

6. SUGGESTED SPECIFICATION TABLE WITH HOURS&MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Total Quality Management (TQM) in Construction	9	8	2	4	14
II	Construction Quality Control Inspection Program	9	4	6	4	14
III	Statistical Quality Control & Monitoring	10	8	4	2	14
IV	Quality References	8	6	4	4	14
V	Sustainable Built Environment- Green Building	6	6	4	4	14
Total		42	44	15	11	70

Legends: R = Remember, U = Understand, A= Apply and above Level (Bloom's revised taxonomy)
Note: This specification table shall be treated as only general guideline for students and teachers. The actual Distribution of marks in the question paper may vary slightly from above table

7. SUGGESTED LIST OF EXERCISES/PRACTICAL

Thepractical/exercisesshouldbeproperlydesignedand implemented withan attemptto develop different types of skills (**Course outcomes in psychomotor and effective domain)** so that students are able to acquire thecompetency. Following is the list of experiments for guidance.

Sr.No.	Unit No.	Practical/Exercise	Appx. Hrs. Required
1	I	Definitions & theory related to TQM	6
2	II	Prepare various construction check lists	8
3	III	8 examples related to statistical quality control	6
4	IV	Practice of NBC & ISO reading	4
5	V	Visit nearby Green Building & make a visit report comparing it with non-green building	4

8. SUGGESTED LIST OF STUDENT ACTIVITIES

1. Visit the Civil Material Testing lab & prepare a report on material testing methodology.
2. Visit ongoing construction site & prepare a report on quality checks.
3. Prepare a list showing various codes used in civil construction activity.

9. SUGGESTED LEARNING RESOURCES

A. BOOKS:

No.	TITLE	AUTHOR	PUBLISHER
1	Total Quality Management	G.Kanji	Springer Science & Business Media
2	Fundamentals of Quality Control and Improvement	Amitva Mitra	Wiley India Private Limited
3	Manual on Quality Control	--	Gujarat Engineering Research Institute
4	Ambuja Technical Literature Series	--	Ambuja Cements
5	National Building Code		

B. Learning Website:

www.nptel.ac.in

http://ndrfandcd.gov.in/Cms/NATIONALBUILDINGCODE.aspx

http://en.wikipedia.org/wiki/Green_building_in_India

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

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