Legends: L- Lecture- Tutorial/Teacher Guided Student Activity; **P -** Practical; **C** Credit; **ESE**-End Semester Examination; **PA**-Progressive Assessment.

5. COURSE CONTENT DETAILS

Unit	Major Learning Outcomes (in Cognitive Domain)	Topics and Sub-topics
Unit-I **Total Quality Management (TQM) in Construction**	1a. Explain features of TQM 1b. Apply various quality checks. 1c. Distinguish between quality control and quality assurance. 1d. List precautions to be taken for accurate measurement	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, calibration, testing, measurements, recording of data and information etc. 1.5 Accuracy in calculation, finding area, volume, etc.
Unit-II **Construction Quality Control Inspection Program**	2a. Describe various aspects of QCIP. 2b. Explain QC aspects of various construction activities. 2c. List tests for ensuring quality of cement and bricks. 2d. List tests to ensure the quality of concrete. 2e. List precautions to be taken for ensuring better quality of RCC. 2e. List dos and don'ts for ensuring quality in plumbing and drainage work.	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. Describe statistical quality control methods. 3b. Explain variables and attributes related to control charts. 3c. Explain SPC and its importance 3d. Describe different types of Attribute-sampling plans. 3e. Explain acceptance sampling. 3f. Interpret different type of 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 Standards**	4a.Use various quality standard codes from its application point of views. 4b. List important clauses with range of acceptable parameters related to quality of cement, bricks, steel and concrete as given in quality standards. 4c. List important provisions of Indian standards about different construction activities. 4d. Explain the main features of ISO9000 and ISO14000 standards.	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. Describe provisions to be made for green building. 5c. Describe provisions to be made for energy efficiency, material efficiency, water efficiency etc. 5d. Explain the concept of siting and structure design efficiency. 5d. Explain techniques for waste reduction. 5e. Suggest methods for enhancing indoor environmental quality.	5.1 Green building – 5.2 Definition – Green Building, Green Construction, Sustainable building 5.3 Goals of Green building 5.4 Advantages and disadvantages 5.5 Strategies 5.6 Certification Agencies – GRIHA, LEED (Highlights & Criteria) 5.7 Life cycle assessment (LCA) 5.8 Siting and structure design efficiency 5.9 Energy efficiency 5.10 Water efficiency 5.11 Materials efficiency 5.12 Indoor environmental quality enhancement 5.13 Operations and maintenance optimization 5.14 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	7	4	3	4	**11**
II	Construction Quality Control Inspection Program	10	6	6	5	**17**
III	Statistical Quality Control & Monitoring	10	6	6	5	**17**
IV	Quality Standards	8	6	4	4	**14**
V	Sustainable Built Environment- Green Building	7	4	3	4	**11**
Total		**42**	**26**	**22**	**22**	**70**

Legends: R = Remember**, U =** Understand**, A=** Apply and above Level (Bloom's revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table