



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Program Name: Diploma Engineering**

**Level: Diploma**

**Branch: Civil Engineering**

**Subject Code: DI05006031**

**Subject Name: Construction Project Management**

<b>w. e. f. Academic Year:</b>	2026-27
<b>Semester:</b>	5th
<b>Category of the Course:</b>	PEC-03

<b>Prerequisite:</b>	Professional Elective Course
<b>Rationale:</b>	<p>Construction projects involve multiple requirements, including a clear understanding of design, planning, and the complete construction process, along with the application of modern business management tools and methods. Project management skills are essential for effective planning, coordination, and control of a project from its initiation to successful completion. Knowledge of various project management techniques is crucial to ensure that construction projects are completed within the stipulated time and budget, which remains one of the biggest challenges in the construction industry. To address this challenge, the project management team must efficiently manage human, material, and financial resources while achieving the predetermined scope, cost, time, and quality objectives. This course is designed to equip students with the ability to plan, organize, and control construction activities using appropriate management techniques and software tools. Upon completion of the course, students will be capable of executing projects within the allocated budget, specified time frame, and desired quality standards. Therefore, this course is highly important for diploma holders in civil engineering, as they are often required to independently manage construction projects.</p>

### Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Describe construction management functions, various organization structures and duties of various construction team.	R, U, A
02	Explain contract and tendering process.	R, U, A
03	Develop the CPM and PERT network of various construction activities.	R, U, A
04	Show leadership skills required to manage various construction resources and achieve targets.	R, U, A
05	Use management information system	R, U, A
06	Show professional ethics and concern for safety during various construction works.	R, U, A

\*Revised Bloom's Taxonomy (RBT)

w.e.f. 2026-27

<http://syllabus.gtu.ac.in/>

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

## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<p><b>Construction Industry &amp; Management</b></p> <p>1.1 Construction Project management- importance, Functions, Scope.</p> <p>1.2 Organization-Types, Characteristics, Functions, principles.</p> <p>1.3 Construction team-Roles, responsibilities and skills of construction team.</p> <p>1.4 Stages in Construction.</p> <p>1.5 Causes of Project failure.</p>	06	15%
2.	<p><b>Tendering and Accounting</b></p> <p>2.1. Contract-Introduction, requirement, types.</p> <p>2.2. Contract documents and conditions of Contract, Contract agreement.</p> <p>2.3. Per-qualification of Contract- Importance.</p> <p>2.4. Tender-Types, Terms and Conditions, issue procedure, opening, Scrutiny, Acceptance, Rejecting.</p> <p>2.5. Prepare tender Notice.</p> <p>2.6. Technical terms- Administrative approval, Technical Sanction, Issue rate, Competent Authority, Secured Advance Mobilization Advance, Earnest money deposit (EMD) and Security deposit (SD)</p> <p>2.7. Accounting terms- Work Abstract, Cash book, Work resister, impress, accounting for the materials, Measurement book, Muster roll, types of bills and recording.</p> <p>2.8. Methods of getting work done in government organization.</p>	10	25%



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3.	<p><b>Time Management Methods and Tools in Construction</b></p> <p>3.1. Method of Construction Scheduling, Development of bar chart, Merits and limitations of bar chart.</p> <p>3.2. Elements of Network: Event, activity, dummy activities, Precautions in drawing Network, Numbering the events.</p> <p>3.3. Work breakdown structure, activity cost and time estimation in CPM and PERT techniques. Type of Floats and their significance.</p> <p>3.4. Critical path method-Important terms, Basic Rules, Advantages and disadvantages.</p> <p>3.5. Examples of CPM and PERT network.</p> <p>3.6. PERT analysis-Important terms, Advantages and disadvantages.</p> <p>3.7. Cost optimization. 3.8 Introduction to Project Management software.</p>	13	30%
4.	<p><b>Construction Resource Management</b></p> <p>4.1 Material management-Purpose, Objective, material Scheduling, material handling, Storage, safety precautions, Economy Order Quantity.</p> <p>4.2 Job layout</p> <p>4.3 Equipment Management: Equipment Scheduling, Factors affecting selection of equipment.</p> <p>4.4 Various costs associated with equipment, Maintenance Management, Replacement of Equipment, Economic life of Equipment.</p> <p>4.5 Manpower Management: Objectives, Labour schedule, output.</p> <p>4.6 Suitable organization structure for construction industry.</p> <p>4.7 Information Management: MIS – its concept and need.</p>	07	15%
5.	<p><b>Human Resource development (HRD)&amp; MIS</b></p> <p>5.1 Importance of HRD.</p> <p>5.2 Supervisor's role as trainer &amp; Motivator.</p> <p>5.3 Techniques to deal human resources effectively.</p> <p>5.4 Professional Ethics in Engineering.</p> <p>5.5 Management Information System: Purpose, Need, Types, Characteristics, Implementation and Applications</p>	05	08%
6.	<p><b>Safety Management</b></p> <p>6.1 Safety management-requirement, importance.</p> <p>6.2 Causes of accidents and its type.</p> <p>6.3 Safety precaution-Excavation work, Demolition, Erection.</p> <p>6.4 Safety measures- Scaffolding, Ladder, Piling, Bituminous works.</p>	04	07%
<b>Total</b>		45	100



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## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
18	26	26	-	-	-

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 with Place, Year and ISBN
1	Construction Project Management	K.K. Chitkara	Tata McGraw-Hill Education, New Delhi, 2011, ISBN: 9780070262567
2	Project Planning and Controlling with PERT and CPM	Dr. B.C. Punmia & K.K. Khandelwal	Laxmi Publications (P) Ltd., New Delhi, 2010, ISBN: 9788131809775
3	Construction Management and Accounts	Harpal Singh	Tata McGraw-Hill Education, New Delhi, 2008, ISBN: 9780070145990
4	Construction of Structures and Management Work	S.C. Rangwala	Charotar Publishing House, Anand, 2012, ISBN: 9789380358663
5	Construction Management Practice	V.K. Raina	Tata McGraw-Hill Education, New Delhi, 2009, ISBN: 9780070146119
6	Project Planning, Scheduling and Control in Construction: An Encyclopedia of Terms and Applications	Calin M. Popescu & Chotchai Charoenngam	John Wiley & Sons, New York, 1995, ISBN: 9780471103452
7	Construction Equipment and Its Management	S.C. Sharma	Khanna Publishers, New Delhi, 1988, ISBN: 9788174090147
8	Construction Planning and Management	P.S. Gahlot & B.M. Dhir	Wiley Eastern Ltd., New Delhi, 1992, ISBN: 9788122410317
9	Construction Project Planning & Scheduling	Charles Patrick	Pearson Education, New Delhi, 2014, ISBN: 9789332550494
10	Construction Management and Planning	Sengupta & Guha	Tata McGraw-Hill Education, New Delhi, 2007, ISBN:



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			9780070265438
11	Project Management: Planning and Control Techniques	Rory Burke	Wiley India Pvt. Ltd., New Delhi, 4th Edition, 2003, ISBN: 9788126504463
12	Construction Planning, Equipment and Methods	R.L. Peurifoy, C.J. Schexnayder & A. Shapira	McGraw-Hill Education, New Delhi, 8th Edition, 2010, ISBN: 9780071289518
13	Construction Project Management: Planning, Scheduling and Controlling	K.K. Chitkara	Tata McGraw-Hill Education, New Delhi, 2009, ISBN: 9780070146195
14	Construction Engineering and Management	Seetharaman S.	Umesh Publications, New Delhi, 2005, ISBN: 9788180300731
15	Construction Equipment and its Planning and Application	Dr. Mahesh Varma	Metropolitan Book Company, New Delhi, 1983, ISBN: 9788123907816

**(b) Open source software and website:**

1. NPTEL Course: Construction Project Management – IIT Kanpur  
<https://nptel.ac.in/courses/112106231>
2. Coursera: Construction Management Specialization (Free Audit)  
<https://www.coursera.org/specializations/construction-management>.
3. Project Management Institute – PMBOK Guide (Free Resources & Templates)  
<https://www.pmi.org/>
4. Virtual Lab – Project Management & Planning Simulations  
<http://vlab.co.in/>
5. Ministry of Education – SWAYAM (Construction Courses)  
<https://swayam.gov.in/>.
6. Primavera P6b
7. MS Project

**Suggested Course Practical List:**

Sr. No.	Practical Outcomes (Pros)	Unit No.	Approx. Hrs. Required
1.	Prepare the list of roles and responsibilities of various personnel in any Private Construction organization.	1	2*
2.	List the reasons of project failure from a given case study.	1	2*



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3.	Study given tender documents and formulate report containing terms and conditions.	2	3*
4.	Study given contract document & analysis its strengths and weaknesses and write a report on it. (Given contraction documents should be comprehensive covering all terms and conditions).	2	2*
5.	Prepare tender notice for given construction work.	2	2*
6.	Prepare a Bar Charts and prepare CPM and PERT for Project scheduling for given project data.	3	4*
7.	Carry out cost optimization for given project.	3	2*
8.	Prepare material and labor schedule for given project data.	4	2*
9.	Prepare the organization chart of any one government/public sector organization executing any major civil engineering projects.	4	2*
10.	Prepare the action plan to reduce the accident on given construction project.	5	2*
11.	Prepare the chart/ power point Presentation on various safety devices used at construction site.	5	2
12.	Study different labor laws applicable for construction project and prepare a report.	4	2*
13.	To visit nearby constructions site and to prepare a report on investment and operating cost, output of various equipment.	5	2
14.	Prepare a presentation on relevant topic and present a seminar.	1,2,3,4,5	4*
<b>Total</b>			<b>33</b>

### Special Instructional Strategies (If Any):

1. Show CPM/PERT chart of real Construction Project
2. Show Bar Chart of real Construction Project
3. Show Schedule of rate book of PWD/CPWD
4. Show tender document of a construction project and ask students to analyses it.
5. Arrange site visit to office of a large construction firm
6. Show video films of construction Project
7. Demonstrate Construction planning software MS Project/Primavera etc.
8. Arrange expert lectures of reputed contractors/builders/ Engineers of Civil departments on management issues.



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9. Present case studies of success and failures in construction projects and ask students to analyses and comment on them.

### **Suggested Activities for Students: If any**

1. Visit to nearby ongoing residential construction site and study management aspect.
2. Visit to PWD office and Draw Organization structure.
3. Visit to PMC.
4. Visit to construction firm office and discuss for understanding of its accounting procedure, material purchasing and material handling techniques.

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