

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM COURSE TITLE: CONSTRUCTION PROJECT MANAGEMENT (COURSE CODE: 3360603)

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

1. RATIONALE:

Project management skills are important for overall planning, coordination, and control of a project from commencement to accomplishment of the project efficiently and effectively. The awareness of various project management techniques is very essential to ensure that construction projects are completed within time and budget which is a biggest challenge. For this to achieve project management team has to manage various resources with the objective to complete the construction project with predetermine scope, cost, time and quality, and the constraints imposed on human material and financial resources. This course is therefore designed in such a way that after learning this course the students will be able to plan, organise and control construction operations by using various management techniques and software. Thus students would be able to complete the project in time & budget and as per desired quality. This course is therefore very important course for diploma holders in civil engineering since they have to manage construction projects on their own.

2. COMPETENCY:

The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competency:

- **Manage various resources and activities, effectively and efficiently using appropriate techniques and software to complete the construction project within time and budget according to desired quality.**

3. COURSE OUTCOMES (COs)

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. Describe construction management functions, various organisation structures and duties of various construction team.
- ii. Explain tendering and accounting process.
- iii. Develop the CPM and PERT network of various construction activities.
- iv. Show leadership skills required to manage various construction resources and achieve targets.
- v. Show professional ethics and concern for safety during various construction works.
- vi. Use management information system.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
L	T	P		Theory Marks		Practical Marks		Total Marks
3	0	2	5	ESE	PA	ESE	PA	150
				70	30	20	30	

Legends: L- Lecture; T- 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 Construction Project and Organisation Management	1a. Describe concept of project management. 1b. Draw the flow chart of an organisation. 1c. Explain the role of different Construction team members. 1d. Describe the causes of project failure.	1.1 Construction Project management- importance, Functions, Scope. 1.2 Organisation-Types, Characteristics, Functions, principles. 1.3 Construction team-Roles, responsibilities and skills of construction team. 1.4 Stages in Construction. 1.5 Causes of Project failure.
UNIT-II Tendering and Accounting	2a. Explain various features of Contract document. 2b. Prepare a Tender document for the construction project. 2c. Explain various technical and accounting terms used in government organisations. 2d. Describe methods of execution of works in government organisations.	2.1 Contract-Introduction, requirement, types. 2.2 Contract documents and conditions of Contract, Contract agreement. 2.3 Per-qualification of Contract- Importance. 2.4 Tender-Types, Terms and Conditions, issue procedure, opening, Scrutiny, Acceptance, Rejecting. 2.5 Prepare tender Notice. 2.6 Technical terms- Administrative approval, Technical Sanction, Issue rate, Competent Authority, Secured Advance, Mobilization Advance, Heads of accounts in government organization, Original and repair work, Earnest money deposit (EMD) and Security deposit (SD), 2.7 Accounting terms- Work Abstract, Cash book, Work resister, imprest, accounting for the materials,

		<p>Measurement book, Muster roll, types of bills and recording.</p> <p>2.8 Methods of getting work done in government organization.</p>
<p>UNIT-III</p> <p>Construction Planning, Scheduling and Time Management</p>	<p>3a. Describe various planning methods for construction works.</p> <p>3b. Prepare Construction schedule.</p> <p>3c. Draw CPM and PERT network for construction work.</p> <p>3d. Describe the features of construction planning software.</p>	<p>3.1 Project Planning-methods and factors affecting planning.</p> <p>3.2 Scheduling and types of Schedules.</p> <p>3.3 Critical path method-Important terms, Basic Rules, Advantages and disadvantages.</p> <p>3.4 Examples of CPM network..</p> <p>3.5 PERT analysis-Important terms, Advantages and Disadvantages</p> <p>3.6 Examples on PERT.</p> <p>3.7 Cost optimization.</p> <p>3.8 Introduction and importance of Primavera and MS Project for Construction Project Management.</p>
<p>UNIT-IV</p> <p>Construction Resource Management</p>	<p>4a. Describe features of material, labour and equipment management.</p> <p>4b. Prepare Job layout.</p> <p>4c. Proper material, labour and equipment schedule.</p>	<p>4.1 Material management-Purpose, Objective, material Scheduling, material handling, Storage, safety precautions, Economy Order Quantity, inspection and testing.</p> <p>4.2 Job Layout.</p> <p>4.3 Labour management-Labour Scheduling, Characteristics, Output of labours, Wages of Workers, Labour Incentives, Labour Welfare, Trade Unions, Trade union act-1926, Mini Wage act-1948, Contract labour act-1970, etc</p> <p>4.4 Equipment management- equipment Scheduling, Classification of various equipment, Factor affecting selection of construction Equipment, Owning & operating cost of equipment, Inspection & testing of equipment, Maintenance & repair of equipment.</p>

UNIT-V Human Resource development (HRD)& MIS	5a. Explain Supervisor's role in Construction work. 5b. Explain MIS with example.	5.1 Importance of HRD. 5.2 Supervisor's role as trainer & Motivator. 5.3 Techniques to deal human resources effectively. 5.4 Professional Ethics in Engineering. 5.5 Management Information System- Purpose, need, Types, Characteristics, Implementation and Applications.
UNIT-VI Safety Management	6a. Explain need of safety management in Construction. 6b. Describe Safety measures in Construction as per IS code.	6.1 Safety management-requirement, importance. 6.2 Causes of accidents and its type. 6.3 Safety precaution-Excavation work, Demolition, Erection. 6.4 Safety measures- Scaffolding, Ladder, Piling, Bituminous works.

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	Introduction of Construction Project Management	6	04	04	02	10
II	Tendering and Accounting	10	02	06	08	16
III	Construction Planning, Scheduling and Time Management	10	04	06	06	16
IV	Construction Resource Management	6	04	04	04	12
V	Human Resource Development and MIS	6	02	04	04	10
VI	Safety Management	04	02	02	02	06
Total		42	18	26	26	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.

7. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

*Note: Here only outcomes mainly in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.*

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

S. No.	Unit No.	Practical/Exercise (outcomes in psychomotor domain)	Approx. Hours Require
1.	I	List the reasons of project failure from a given case study.	2
2.	I	Study given tender documents and formulate report containing terms and conditions.	2
3.	II	Study given contract document & analysis its strengths and weaknesses. (Given contraction documents should be comprehensive covering all terms and conditions).	4
4.	II	Prepare tender notice for given construction work.	2
5.	II	Prepare at least two Bar Charts and prepare CPM and PERT for Project scheduling for given project data.	6
6.	III	Prepare material and labour schedule for given project data.	2
7.	IV	Prepare equipment schedule by using MS Project for given project data.	2
8.	IV	Study different labour laws applicable for construction project and prepare a report.	2
9.	ALL	Prepare a presentation on relevant topic and present in a seminar	6
Total Hours			28

8. SUGGESTED LIST OF STUDENT ACTIVITIES

- i. Visit to nearby ongoing residential construction site and study management aspect.
- ii. Visit to PWD office and Draw Organisation structure.
- iii. Visit to PMC.
- iv. Visit to construction firm office and discuss for understanding of its accounting

procedure, material purchasing and material handling techniques.

9. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

- i. Show CPM/PERT chart of real Construction Project
- ii. Show Bar Chart of real Construction Project
- iii. Show Schedule of rate book of PWD/CPWD
- iv. Show tender document of a construction project and ask students to analyse it.
- v. Arrange site visit to office of a large construction firm
- vi. Show video films of construction Project
- vii. Demonstrate Construction planning software MS Project/Primavera etc.
- viii. Arrange expert lectures of reputed contractors/builders/ Engineers of Civil departments on management issues.
- ix. Present case studies of success and failures in construction projects and ask students to analyse and comment on them.

10. SUGGESTED LEARNING RESOURCES

A. Books:

No.	Title	Author	Publisher
1	Construction Project Management	K.K.Chitkara	Tata McGraw-Hill
2	Project Planning and Controlling with PERT And CPM	Dr. B.C.Punmia K.K.Khandelwal	Laxmi Publications (P)Ltd.
3	Construction Management and accounts	Harpalsingh	Tata McGraw-Hill
4	Construction of Structures and Management work	S.C.Rangwala	Charotar Publication
5	Construction Management practice	V.K.Raina	Tata McGraw-Hill
6	Construction Equipment and its Management	S.C.Sharma	Khanna Publication
7	Construction Planning and Management	P.S.Gahlot B.M.Dhir	Willey Eastern Ltd
8	Construction Engineering and Management	Seetharaman.S	Umesh Publication

B. List of Recommended I.S. Publications:

IS 4082:1996	Recommendations on stacking and storage of construction materials and components at site
IS 7293:1974	Safety code for working with construction machinery
IS 7969:1975	Safety code for handling and storage of building materials
IS 10067:1982	Material constants in building works
IS 15883-1:2009	Construction project management - Guidelines, Part 1: General
IS 15883-2:2013	Construction project management - Guidelines, Part 2: Time Management
IS 3764:1996	Excavation
IS 4130:1976	Demolition of Building
IS 7205:1974	Erection of steel Structure.
IS 8969:1978	Erection of Concrete Framed Structure.

C. List of Software/Learning Websites

- i. Primavera P6b
- ii. MS Project
- iii. www.slideshare.net
- iv. www.civil.iitm.ac.in

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE**Faculties from Polytechnics, Gujarat**

- **Prof. Bhavesh V. Modi**, Principal B.V.P.I.T. (D.S.), UmraKh, Bardoli.
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