

**COURSE TITLE : CONSTRUCTION MANAGEMENT AND SAFTY ENGINEERING**  
**COURSE CODE : 3030**  
**COURSE CATEGORY : B**  
**PERIODS/WEEK : 4**  
**PERIODS/SEMESTER : 72**  
**CREDITS : 4**

**TIME SCHEDULE**

<b>MODULE</b>	<b>TOPIC</b>	<b>PERIODS</b>
I	Introduction to Construction Management, Planning and Organizational aspects, Constructional planning	18
II	Execution of works, Contracts, Tender and tender notices, Measurement of works, Payment of bills	18
III	Introduction to Human Resource Management, Stores, Managing materials and machinery	18
IV	Principles of safety in construction activity , Entrepreneurship and management, Introduction to small scale Industries, Introduction to quality control, T.Q.M and I.S.O 9000	18
	<b>TOTAL</b>	<b>72</b>

***RATIONALE:***

*On completion of this course the student should conceive the management aspects in construction industry, from the planning phase of a project to the execution of the project with optimum use of men, material, machinery, money and time assuring quality, safety, utility and economy in the construction.*

**OBJECTIVES**

Upon completion of the course the student should be able to

**MODULE-I**

- 1.1.1 Know the objectives of construction Management
- 1.1.2 Explain the term construction management
- 1.1.3 States the need of construction management
- 1.1.4 List the factors involved in construction management
- 1.2.1 Understands the need for preliminary planning
- 1.2.2 Explain the importance of preliminary planning
- 1.2.3 Explain the difference between feasibility report and project report
- 1.2.4 Explain the data to be collected and aspects to the considered in project
- 1.2.5 Explain the organizational set up of public works department and List the duties of officers.
- 1.2.6 Explain budget provision, administrative sanction and technical sanction.
- 1.3.1 Understand construction planning, construction stages and construction operation

- 1.3.2 Explain the concept and use of construction schedule, material and labour schedule
- 1.3.3 Explain bar charts and its limitations
- 1.3.4 Explain critical path method and PERT
- 1.3.5 Explain network diagram with examples

## **MODULE-II**

- 2.1.1 Understands the procedure for execution of works
- 2.1.2 Understand the procedure of fixing agencies for execution of works
- 2.1.3 Distinguish between permanent and work charged establishment
- 2.2.1 Define the terms contract and tender
- 2.2.2 Explain various contract systems
- 2.2.3 Merits and limitations of each contract system
- 2.3.1 Explain the tender system
- 2.3.2 Explain the procedure of calling tenders
- 2.3.3 Draft a tender notice
- 2.3.4 Prepare tender document
- 2.3.5 Explain EMD and SD and its need
- 2.3.6 Explain the method of selecting a contractor
- 2.3.7 List out conditions of contract agreement
- 2.4.1 Measurements of works and the importance of measurement books
- 2.4.2 List the rules to be followed in recording measurement
- 2.4.3 States the need for pre-measurement and check measurement
- 2.4.4 States the need for acceptance of the measurement by the contractor.
- 2.5.1 Lists the methods of payment to contractors and types of bill to be used
- 2.5.2 Explains the steps involved in checking of the bills
- 2.5.3 List the recoveries to be made from bills
- 2.5.4 Explains the need for contractor's ledger – Imprest account, works register, works account and abstract.

## **MODULE-III**

- 3.1.1 Understand the aspects of Human Resource Management
- 3.1.2 Differentiate recruitment, selection and appointment of employees and training employees
- 3.1.3 Understand the dynamics of Managing of men
- 3.1.4 Understand the role of labour well fare and Trade Unions.
- 3.2.1 Understand stores management and explain the need and different types of stores
- 3.2.2 State the classification of items held in general store
- 3.2.3 State the need of materials at site account, intend and stock register.
- 3.2.4 Explain the procedure of taking delivery from station yards, demurrage etc
- 3.2.5 Explain the necessity for periodical inspection
- 3.3.1 Explain the selection and optimum use of materials as per standards in construction activities.
- 3.3.2 List the precautions to be taken during handling materials
- 3.3.3 List the different types of construction equipments (Earth moving, concreting, lifting & hoisting, Road work equipments, Pumps etc) selection and precautions to be taken during handling

## **MODULE-IV.**

- 4.1.1 Understand safety measures in construction industry
- 4.1.2 Identify the causes and effects of accidents
- 4.1.3 Discuss the methods of prevention of accidents and the role of site Engineer/supervisor
- 4.1.4 Discuss the basic guide lines for safety in construction industry
- 4.2.1 Defines the word entrepreneur and the role of entrepreneur in economic development

- 4.2.2 Describes entrepreneurship in construction firms, entrepreneurial motivation and advantages and disadvantages in entrepreneurship.
- 4.2.3 List the institutions supporting entrepreneurship and their role
- 4.3.1 Introduction to small scale Industry, its role in economic development.
- 4.3.2 Understands the requirements of a licensed surveyor and contractor
- 4.3.3 Understand statutory requirements of small scale industry
- 4.3.4 List the different agencies promoting small scale industries and supports given.
- 4.4.1 Understand the importance of quality control, T.Q.M and I.S.O. certifications:
- 4.4.2 Explain quality systems and elements of quality systems
- 4.4.3 Knows the principle of quality assurance and Indian standards on quality systems
- 4.4.4 Discuss ISO 9000 -series of quality systems and List merits and demerits of ISO 9000

## COURSE CONTENT

(With special reference to the practices in Kerala P.W.D)

### UNIT – I

**Introduction to construction management** – Need for construction management – factors involved in Construction management.

Preliminary planning and organizational aspects importance of planning – site investigation – Feasibility report – collection of data and preparation of project report – different organizations - Engineering department organizational structure of PWD – and responsibilities - Role of various Officers- (over seer, AE, A Ex E,EE,SE &CE )

Estimates – preliminary estimate – detailed estimate – budget provision – Administrative Sanction and technical sanction – powers of sanction.

**Construction Planning** -Construction stages – construction operation- schedule- procurement of labour, material and equipment – programme of work – objectives of programming – job layout – bar chart and flow process chart – Work study – critical path method – preparation of network diagram – critical path and calculation of Float times. Scheduling by PERT. Comparison between PERT and CPM.

### UNIT – II

**Execution of Works** - Permanent and work charged establishments-specifications – enforcement of specifications – inspection by officials – quality control – supervision – sampling and testing of materials. Regulation of departmental labour muster roll and casual labour roll – out turn – plant capacities and hire charges.

**Contracts**- Legality of contracts, types of contracts piecework contracts, lump sum contracts, item rate contract, percentage contract – negotiated rates – departmental execution of works – piecework system – merits and demerits of each contract system.

**Tender and Tender notices**- Necessity of tenders – sealed tenders – tender notice, tender document – Earnest money and security deposit – opening of tenders – scrutiny of tenders – comparative statements –selection of contractors- negotiation, acceptance of tender, work order – contract agreement – conditions of contract Measurement of Works- Measurement book – Rules to be followed in recording measurements – pre-measurements and check measurements – contractor’s acceptance of measurement

**Payment of Bills** Types of bills – first and final bills- preparation of bills – running account bills -modes of payment– hand receipts - checking of bills – recoveries to be made from bill – contractors ledger – imprest

account – works register – works account and abstract.

### **UNIT-III**

**Human Resource management** – Definition – Difference between selection, appointment and recruitment – training of employees – managing men - labour well fares-trade unions –

**Stores**-Classification of stores – materials – heavy plant and machinery - material handling – transport vehicles – inspection of vehicles – tools and plants- materials at site – borrowing and lending of tools and plants – safe custody of stores- procedure of taking delivery from station yards, demurrage - issue of stores materials – indent -stock register – periodical inspection of stores verification and accounting of shortage and surplus – write off.

**Materials management** – Definition – selection of material as per standards – Optimum use of materials

**Construction machinery**- Earth moving equipments –crawler and wheel tractors- bull dozers-uses- Operation of power shovels-selection- output of power shovel- Drag-lines-types-operations- output of Drag lines- Hoes-operations-output of hoes.

Concrete Machinery-concrete mixers-classification-ready mix plants-compaction machinery-vibrators- Lifting and hoisting machineries-pumps -types -uses.

### **UNIT – IV**

**Principles of safety in construction**- causes, effects and prevention of accidents, safety practices in construction - Site Engineers/Supervisor's role - safety through legislation – precautions during handling of materials occupational hazards and basic guidelines for safety in construction industry

**Entrepreneurship and Management** -Entrepreneurship – concept – definition, role, and expectation –

Entrepreneurship in construction related activities. Technocrats – managers –

Entrepreneurial Motivation and Development -advantages and disadvantages –List the institutions supporting entrepreneurship and their role.

**Small scale Industry** - growth-its role in economic development.

Understands the requirements of a licensed supervisor, surveyor and contractor

Understand statutory requirements of small scale industry

List the different agencies promoting small scale industries- Assistance Programme for small enterprises.

**Quality Management**-Introduction to quality control and quality assurance system – elements of quality- ISO 9000 and T.Q.M. – Quality systems – Definitions of quality policy, quality management quality system – Indian standards on quality system – ISO 9000 – Merits and demerits.

### **REFERENCES**

1. Construction Management TTTI, Madras- Oxford University Press
2. Construction Management & Industrial Projects – Bhattachargee- Khanna Publishers.
3. Principals of Construction management-Jha -Pearson.