GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Civil Engineering

Course / Subject Code : DI03006011

Course / Subject Name: Construction Technology

w. e. f. Academic Year:	2024-25
Semester:	3rd
Category of the Course:	ESC

Prerequisite:	Students must have proficiency in Building drawing, Basic knowledge of construction site and Students have a keen interest in building construction work.
Rationale:	Construction technology is a core subject in civil engineering. This subject is intended for gaining useful knowledge with respect to facts, Concepts, principles and procedures related to building construction system so that student can effectively able to execute building construction work and carry out repairs and maintenance of existing building with safety and quality in construction.

Course Outcome:

After Completion of the Course, the Student will able to:

No	Course Outcomes	RBT Level
01	Identify the various types of civil engineering structure and components with its function.	R & U
02	Select the suitable types of foundation as per the site situation and soil condition.	R, U, & A
03	Implement various construction activities like Masonry, Concreting, Formwork, Plastering, Pointing, D.P.C, Anti termite treatment and Plumbing/ Electrical fittings etc as per need.	R, U, & A
04	Understand their functions, operations, maintenance, safety considerations, and the impact of mechanization on the construction industry	R, U, & A
05	Describe the importance of maintenance work and inculcate safety measures to be adopted in civil engineering activities.	R & U
06	Understand different construction technologies and applying them effectively.	R & U

**Revised Bloom's Taxonomy (RBT)*

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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA (M)	PA (I)	ESE (V)	
02	00	02	03	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1	**Introduction to Construct Technology:** 1.1 Classification of various types of civil engineering Structures. 1.2 Cross section of wall showing all component of residential Building. 1.3 Function of Various component of Building. 1.4 Difference between Load Bearing & Framed Structure	02	8 (6 Marks)
2	**Foundation :** 2.1 Definition ,Purpose and Classification of Foundation 2.2 Difference between Shallow & Deep Foundation. 2.3 Selection of the suitable type of foundation for required structure as per situation. 2.4 Purpose, Features, Procedure and advantages of under reamed pile. 2.5 Foundations in black cotton soil and loose soils. 2.6 Timbering in trenches 2.7 Procedure of Setting out of foundation layout 2.8 Failure of foundation and its remedial measures.	05	20 (14 Marks)
3	**Building Construction & Building items** 3.1 Size, Material, Technical term , Types of Bond and Joints in masonry, Procedure ,Tools used ,Principle of Masonry work ,Advantages –disadvantages for the Brick and Stone masonry 3.2 Definition, Ingredients ,Grade , W/C Ratio, Production of Concrete, types of Special Concrete, Quality control of Concrete 3.3 Definition, Purpose, Technical terms and types of Scaffolding,	12	40 (28 Marks)

	Form work and centering and its selection as per situation. 3.4 Definition, purpose, types, tools and material used , Procedure and its suitability for Plastering & Pointing. 3.5 Definition, sources of Dampness and ill effects, Material and Methods used for Damp Proof Course (DPC) 3.6 Anti Termite Treatment Procedure and 3.7 Purpose, Types and Material used for Construction Joints. 3.8 Importance, Material, Methods and Machineries used in Grouting and guniting (shotcrete). 3.9 Various Types of fitting Accessories, Tools and Laying procedure for house hold Plumbing and Electrification.		
4	**Construction Machineries :** 4.1 Purpose and Necessity of construction Machineries. 4.2 Important factor affecting selection of Construction Machineries. 4.3 Classify the different types of Construction. 4.4 Feature, working procedure, output and suitability in construction for machineries used for work Like Excavating, Earth Moving, Hoisting, Transportation for short & long distance, Compaction , Concrete production Batch mix Plant , Bitumen hot mix plant, Aggregate Production Plant etc.	04	9 (6 Marks)
5	**Building Maintenance & Safety Measures** 5.1 Causes of failure of structures 5.2 Purpose and Necessity of Building Maintenance. 5.3 Types of Maintenance work 5.4 Maintenance report & its estimate 5.5 Procedure for the maintenance work for • Repairing of Plaster work • Replacing old door/window frame by new frame • 5.6 Importance of Safety in construction. 5.7 Causes of accidents in construction work. 5.8 Safety Equipments used in Construction works, its function, Feature and specification. 5.9 Classify the damages due to accidents in construction. 5.10 Safety Precautions taken for the works like • Safety measure during Excavation work. • Safety measures for Demolition of building. • Safety measures for erection of concrete framed	04	14 (10 Marks)

	structure. • Safety measure during masonry work.		
6	**Recent Advancement in Construction Technology** 6.1 Importance of Technologies used in Construction Industries. 6.2 Benefits of using Technologies in Construction. 6.3 The use ,Feature and limitation of the Technology like 3 D Printing in construction ,Robotics and Automation ,Drones for surveying and Monitoring, Virtual and Augmented Reality (VR/AR),Wearable Technology, Modular and Prefabricated Construction ,Green Building Technology.	03	9 (6 Marks)
	Total	**30**	**100**

Suggested Specification Table with Marks (Theory): (in %)

Unit No	Unit Title	Distribution of Theory Marks (in %)					
		R Level	U Level	A Level	N Level	E Level	C Level
1	**Introduction**	2	4	-			
2	**Foundation**	3	5	6			
3	**Building Construction & Building Items**	4	10	14			
4	**Construction Machineries**		3	3			
5	**Building Maintenance & Safety Measures and**	2	4	4			
6	**Recent Advancement in Construction Technology**	3	3	-			
	Total	14	29	27	-	-	-

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:

S. No.	Title of Book	Author	Publication with place, year, and ISBN
1	Building Construction	B.C. Punmia	Charotar Publication, Dist-Anand

S. No.	Title of Book	Author	Publication with place, year, and ISBN
			(ISBN-13: 978-8185594859)
2	Building Construction	B. C. Punrnia and A.K. Jain	Firewall Media, 2005 (ISBN 9788170080534)
3	Building Construction	S.K. Sharma	S. Chand and Co. Pvt. Ltd., New Delhi (ISBN:978-81-219-0479-7)
4	Building Construction	S. P. Arora and Bindra	Dhanpat Rai Publication, Delhi Edition 2013.1SBN: 9788189928803
5	Building Construction	Dr.Janardan Zha	Khanna Publication, New Delhi 2007, ISBN —8174091106
6	Building Construction	S. S. Bhavikatti	Vikas Publication House Pvt. Ltd., New Delhi (ISBN: 978-93259-6079-41)
7	A to Z Building Construction	Sandip Marini	Satya Prakashan; New Delhi (2015) (ISBN-13: 978-8176849692)
8	Building Construction	Dr Rinku Kumar and Dr Sandip Panchal	AICTE ,2022 ISBN :978-81-960386-8-7
9	PWD Handbooks for Materials, Masonry. Building, Plastering and Pointing-Foundation	All India Council for Technical Education	All India Council for Technical Education (AICTE)
10	Practical Civil Engineering Handbook	Khanna	Khanna Publication
11	National Building Code	BIS	Bureau of Indian Standard, New Delhi , ISBN-10 :8170610990 , ISBN-13:978-8170610991
12	Practical Handbook On BUILDING CONSTRUCTION	Er M.K.Gupta	Nabhi Publication
13	IGBC Green new building rating System version 3.0	IGBC	IGBC ,2016

(b) Open-source software and website:

1. https://nptel.ac.in/
2. https://www.constructiontechnology.in/
3. http://www.understandconstruction.corni
4. http://www.constructionknowledge.netiwww.learn-to–draw.com
5. https://www.igbc.in/
6. https://www.grihaindia.org/

Exp. No.	List of Practicals	Unit No.	Approx. hrs. Required
1	Visit your own Campus/Department building and Identify the Components.	1	02
2	Draw the sketches for the Different types of Foundation and Timbering.	2	02
3	Visit Nearby construction site where the foundation work is in progress, observe the procedure, Equipments and Machineries uses at site with the safety measure and Prepare report on it.	2,4,5	04
4	Setting out the layout plan for the two room building for column/wall for given plan in the assigned group	2	02
5	Draw the sketches for the Different types of masonry, scaffolding and Form work ,Construction Joints and Damp proof Courses	3	06
6	Arrange the Brick masonry layer -1and Layer-2 for any two Bonds in the Laboratory or at field as per suitability.	3	02
7	Visit Nearby construction site where the Brick & stone masonry work is in progress, observe the procedure, Equipments and Machineries uses at site with the safety measure and Prepare report on it.	3,4,5	04
8	Visit Nearby construction site where the Plastering, Pointing, DPC, Termite Treatment, Construction joints, Grouting, Plumbing and Electrification work is in progress, observe the procedure, Equipments and Machineries uses at site with the safety measure and Prepare report on it.	3,4,5	04
9	Draw the sketches for the Different types of Construction Machineries.	4	02
		Total	**28**

List of Laboratory / Learning Resources Required:

S. No.	Equipment /Tool/Material Name	Experiment No.
1	Measuring tape such as Metallic tape, fiberglass tape, invar tape, steel tape, linen tape, etc. (20m, 30m) 4 Nos.	4,6
2	Lime powder (10 kg -15 kg)	4
3	Hammer – 2 Nos	4
4	String 50 m long	4 ,6
5	Metal rod for Marking 20 Nos (Dia:16 mm , Length: 600 mm)	4
6	Bricks 100 -150 Nos.	6

Note: It is recommended that the standards specified in the relevant I.S. Codes should be met by Equipment to ensure accuracy and reliability.

Suggested Project List:

(A) Failure of Foundation and its remedial measures.

(B) Pile foundation as important foundation for Heavy, High rise and under water structure.

(C) Precast fly ash block masonry

(D) Grouting and Shotcrete Technology

(E) Machineries and Plants used in Construction

(F) Safety Equipment used in construction.

(G) Recently adopted advanced construction Technology in Industry.

(H) Case study on Green Building for Material, Technology and Rating system adopted at building.

Suggested Activities for Students:

(I) Visit your nearby buildings and identify the different building components.

(J) Visit Nearby Construction site and see the types of foundation used at that site.

(K) Collect the information of latest technologies used in building construction and prepare report on it

(L) Prepare a report on remedial measures that can be taken to repair the cracks in the nearby building.

(M) Prepare posters/ charts for the awareness of safety in various activates of civil engineering construction.

(N) Visit Nearby construction site /Industry collect information about safety equipments and prepare presentation.

(O) Visit your campus / Nearby Building and Collect the defects in building need maintenance and prepare brief report of Maintenance work.

(P) Collect the information about latest construction technology used in construction and prepare report on it.

(Q) Visit Green building and collect information about technologies and rating system adopted in building.

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