GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM

Course Title: BUILDING MATERIALS (Code: 3330601)

Diploma Programme in which this course is offered	Semester in which offered
Civil / Environment Engineering	THIRD

1. RATIONALE :

The selection of materials for engineering purpose is very much crucial activity. In civil engineering any material of construction, the first and for most necessisity is to know its properties, suitability, strength and durability. Based on this, one can suggest the most suitable material which may fit the exact requirement of the construction items. In this course, the technology related to some of the important and widely used construction materials has been dealt with. This course will enrich civil engineering technicians in performing their jobs with ease and confidence and will be able to select appropriate material for the given item of work on site.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop with different types of skills so that students are able to acquire following competencies

1. To develop the conceptual knowledge in building material.
2. To select appropriate material in given field situation.
3. To develop awareness about latest building materials.

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
03	00	02	05	70	30	20	30	150

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

4. COURSE DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I INTRODUCTION	1. Describe important properties of building materials used in civil engineering construction	1.1 Physical , chemical and engineering properties of building materials. 1.2 Application of building materials 1.3 Alternative materials for the given items in building construction.
Unit – II CLAY PRODUCTS	2 Identify clay based products for use in building constructions based on its properties.	2.1 Classification of clay products 2.2 Types of bricks 2.3 Manufacturing process of bricks 2.4 Test on bricks 2.5 Standard requirements and grades of bricks as per BIS 2.6 Types of clay tiles and its uses
Unit – III ROCKS AND STONES	3. Select appropriate rock / stone products for different uses in building construction	3.1 Classification of rocks 3.2 Rock products 3.3 Characteristics of stones - Structure , texture , strength , gravity , porosity , absorption , hardness , durability, weight.. etc. 3.4 Standard requirement of building stone 3.5 Important stones used in construction with its suitability.
Unit – IV LIME AND POZZOLANA	4.Appreciate the uses of lime and Pozzolana products in building construction	4.1 Sources and classification of Lime 4.2 Uses of lime with specific field situation 4.3 Types of poozzolanic materials 4.4 Advantages of addition of pozzolonic material
Unit – V CEMENT CONCRETE	5 Select appropriate ingredients of proper quality for cement concrete as per required BIS codes	5.1 Types of cement with their specific use 5.2 Grade of cement as per BIS 5.3 Engineering properties of cement 5.4 Field and laboratory test of cement as per BIS 5.5 Methods of storing the cement 5.5 Types of aggregate as per BIS 5.6 Requirements of aggregate as per BIS 5.7 Engineering properties of aggregate 5.8 Test on aggregate
Unit – VI TIMBER	6. Describe timber and wood products and its uses in building construction	6.1 Types of timber 6.2 Uses and application of timber 6.3 Defects in timber and wood 6.4 Seasoning, 6.5 Wood products with specific uses
Unit – VII MISCELLANEOUS CONSTRUCTION MATERIALS	7. Explain different types of advanced building materials and their uses in construction.	7.1 Plastics and PVC 7.2 Ceramic products 7.3 Paints and Varnish 7.4 Materials for damp proofing , water proofing 7.5 Materials for anti termite treatment 7.5 Glass and fiber 7.6 Steel and iron materials 7.7 Materials used for false ceiling 7.8 Asbestose 7.9 Concrete blocks

5. 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	04	03	04	00	07
II	CLAY PRODUCTS	10	03	04	07	14
III	ROCKS AND STONES	04	03	04	00	07
IV	LIME AND POZZOLANAS	04	03	04	00	07
V	MATERIALS FOR CEMENT CONCRETE	10	03	04	10	17
VI	TIMBER	04	00	03	04	07
VII	MISCELLANEOUS MATERIALS	06	00	03	08	11
Total		**42**	**15**	**26**	**29**	**70**

6. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills so that students are able to acquire the competency. Following is the list of experiments for guidance.

S. No.	Unit No.	Practical/Exercise	Apprx. Hrs. Required
1	I	Conduct local market survey for different civil engineering materials with respect to applications cost , and. quality	Home assignment
2	II	Perform tests on given sample of brick such as • Soundness • Water absorption • Compressive strength	06
3	III / IV	Idenfication of different types of stones and lime	02
4	II / V	Conduct field test on given sample of brick and cement	04
5	V	Perform lab tests on given sample of cement • Initial and final setting time • Compressive strength	04
6	V	Conduct field test on given sample of fine and coarse aggregate	02
7	IV	Perform test on given sample of fine aggregate • Sieve analysis • Silt and clay content	04
8	VI	Assess the quality of different types of timber and timber products (please arrange to visit nearby saw mill or timber mart)	02
9	VII	Prepare a report regarding collected miscellaneous civil engineering materials with respect to cost , quality and applications..	04
		Total	**28**

7. SUGGESTED LIST OF STUDENT ACTIVITIES

- Prepare a list of construction materials adopted in your residence.
- Observe AND WRITE A REPORT OF SELECTION AND USE OF APPROPRIATE BUILDING MATERIAL AT GIVEN CONSTRUCTION SITE

8. SUGGESTED LEARNING RESOURCES

(A) List of Books:

SR. No.	Title of Books	Author	Publications
01	Engineering Materials	Dr. Janardan Jha	Khanna
02	Materials of Construction	A K Roy Chaudhary	
03	Building materials	S. K. Duggal	New Age International
04	Engineering Materials	Vazirani and Chandola	
05	Engineering Materials	S C Rangwala	Charotar
06	Construction Materials	D.N. Ghose	TATA Mc Graw Hill
07	Civil Engineering materials	TTTI ,Chandigarh	TTTI

Handbooks

SR. No.	Title	Author
01	PWD Handbooks for -Materials - Masonry -Building -Plastering and Pointing - Foundation	All India Council for Technical Education
02	Practical Civil Engineering Handbook	Khanna

BIS/ International Codes of Practice:

SR. No.	Title
01	National Building Code

B. List of Major Equipment/Materials

1. UTI/ Compression testing machine capacity – 40 tonne
2. Vicat apparatus for cement testing
3. Sets of sieve and sieve shaker
4. Abrasion testing machine with balls
5. Impact machine
6. Weighing machine of required capacity.

C List of Software/Learning Websites

01	Khan academy
02	Civilengineering.org

9. INSTRUCTIONAL STRATEGIES

Lecture ,Charts, PPt, Assignments, Demonstration, Field Visits.

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

1. Mr. Bhavesh V, Modi (Principal) BVPIT(DS) Umrakh
2. Mr. V.K.Shah (Head) Dr.S&S.Gandhi College, Surat
3. Mr. A.K.Popat (Sr.Lect) Government Polytechnic, Dahod

Coordinator and Faculty Members from NITTTR Bhopal

1. Dr.V.H.Radhakrishnan PROFESSOR , DEPARTMENT OF CIVIL & ENVIORNMENT ENGINEERING
2. Dr. A K JAIN , PROFESSOR , DEPARTMENT OF CIVIL & ENVIORNMENT ENGINEERING
3. Prof J.P.Tegar, PROFESSOR AND HEAD , DEPARTMENT OF CIVIL & ENVIORNMENT ENGINEERING