

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Diploma Engineering				Branch	Civil Engineering			
Semester	III				Version	1.0.0.0			
Effective from Academic Year			2019-20		Effective for the batch Admitted in			June 2019	
Subject code	1CI2304		Subject Name		Engineering Materials.				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:
This course provides an introductory over view of the various materials used in construction. Civil Engineering Workshop (1ES103)

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes: CO1. Identify various construction materials. CO2. Know and differentiate elemental properties of construction materials. CO3. Demonstrate an appropriate application of construction material. 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.

Course Content				
Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
<b>UNIT – 1 INTRODUCTION</b>	1.1 Importance & introduction to basic building materials and their suitability. 1.2 Explain their physical, chemical & mechanical properties. 1.3 Parameters to be considered while selecting appropriate alternative materials.	1a Describe important properties of building materials used in civil engineering construction.	02	02
<b>UNIT – 2 CLAY PRODUCTS</b>	2.1 Classification of clay products. 2.2 Standard requirements of quality bricks as per I.S. like size, water absorption, shape, colour, texture, compressive strength. 2.3 Selection of brick by conducting field tests. 2.4 Forms of special bricks, Refractory bricks. 2.5 Manufacturing process of bricks. 2.6 Advantages of bricks over stones as a construction material, Glazing.	2a Identify clay based products for use in building constructions based on its properties.	10	07

<p><b>UNIT – 3 STONES</b></p>	<p>3.1 Introduction, requirements of good building stones, uses of stones, classification of 3.2 Stones, common building stones of India and their uses. 3.3 Stone cladding, artificial or cast stones. 3.4 Preservation of stones. 3.5 Quarrying of stones.</p>	<p>3a Select appropriate rock / stone products for different uses in building construction.</p>	<p>10</p>	<p>07</p>
<p><b>UNIT – 4 LIME</b></p>	<p>4.1 Introduction, 4.2 Classification of lime, calcinations and slaking of lime. Uses of lime. 4.3 Differentiate : Fat lime &amp; hydraulic lime. 4.4 Suggest suitable types of lime for the following situations. 4.5 Methods to improve hydraulicity &amp; setting properties of fat lime.</p>	<p>4a. Appreciate the uses of lime and Pozzolana products in building construction.</p>	<p>08</p>	<p>05</p>
<p><b>UNIT – 5 MATERIALS FOR CEMENT CONCRETE</b></p>	<p>5.1 Introduction, ingredients, manufacturing, types and uses. 5.2 Methods of storing cement &amp; importance of freshness of cement 5.3 Use of admixtures 5.4 Test for cement - and its necessity 5.5 Verities of coarse aggregates. I.S. - 2720 classification. 5.6 Size requirements as per I.S.-456, Use of coarse aggregates for general &amp; specific purpose. 5.7 Use of round &amp; square irregular coarse aggregates. 5.8 Tests on course- aggregates abrasion test, impact test. 5.9 Fine aggregates (Sand). 5.10 Types of fine aggregates. I.S.-2720 classification Size requirements as per I.S.-456. 5.11 Use of fine aggregates for general &amp; specific purpose Tests on fine aggregates.</p>	<p>5a. Select appropriate ingredients of proper quality for cement concrete as per required</p>	<p>10</p>	<p>07</p>
<p><b>UNIT – 6 TIMBER</b></p>	<p>6.1 Characteristics, classification, sources, structure and growth of tree, conversion of wood. 6.2 Seasoning, defects, deterioration and preservation, special timber products and its merits and demerits, use. 6.3 Common timber in India.</p>	<p>6a. Describe timber and wood products and its uses in building construction.</p>	<p>05</p>	<p>05</p>
<p><b>UNIT – 7 STEEL PRODUCTS</b></p>	<p>7.1 Introduction: Types of ferrous metals and their properties in brief. 7.2 Structural properties of steel. 7.3 Designations &amp; uses of different steel sections for the given situation.</p>	<p>7a. Describe steel and different steel sections and its uses in building construction.</p>	<p>10</p>	<p>07</p>

	<p>7.4 Advantages of deformed bars over M.S. bars.</p> <p>7.5 Compare the yield strength.</p> <p>7.6 Appropriate steel of different diameter &amp; grades for the given purpose or situation.</p> <p>7.7 Special purpose steels (new varieties).</p>			
<b>UNIT – 8 MISCELLANEOUS MATERIALS</b>	<p>8.1 Plastics and PVC (high density). Asbestos- sheets, pipes &amp; paints as used in industry.</p> <p>8.2 Glass as used in building industry. Bituminous materials- their content &amp; origin</p> <p>8.3 Asphalt, tar, bitumen - their specific uses. Compare their properties.</p> <p>8.4 Adhesives - organic &amp; synthetic. Paints &amp; varnishes -necessity of its application requirement of good paint. Porcelain materials.</p> <p>8.5 Fire proofing materials. Insulating materials.</p>	8a. Explain different types of advanced building materials and their uses in Construction.	05	05
		Total	60	45

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

List of Instruments / Equipment / Trainer Board	
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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.

List of Reference Books			
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No	Title of Reference Books	Authors	Publication
1	Engineering Materials	S C Rangwala	Charotar
2	Building materials.	S. K. Duggal	New Age International
3	Building materials.	R.P.Rethaliya	Atul Prakashan

Link of Learning Web Resource	
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1	Khan academy
2	Civilengineering.org

## PO & CO Mapping

Sr.No.	Name of PO	Description	Co1	Co2	Co3	Co4
1	PO 1	Acquire fundamental knowledge of mathematics, science, and civil engineering.	None	Slight	Slight	
2	PO 2	Design and conduct experiments, as well as analyze and interpret data.	None	Slight	Slight	
3	PO 3	Use the techniques, skills, and modern engineering tools necessary for engineering practice	None	Slight	None	
4	PO 4	Function in multi-disciplinary teams and identify, formulate, and solve engineering problems.	None	Slight	Slight	
5	PO 5	Clear understanding of his duties and responsibilities as a civil engineer.	Slight	Slight	Moderate	
6	PO 6	Develop effective communication skill and provide leadership for professional development.	Slight	Moderate	Slight	
7	PO 7	Engage in life-long learning in civil engineering field and comprehend issues related to environment and sustainable development.	Moderate	Moderate	Moderate	
8	PO 8	Graduate will demonstrate knowledge of professional and ethical responsibilities.	Slight	Slight	Slight	
9	PO 9	Incorporate economics and business practice including project and risk management.	Slight	None	Slight	
10	PO 10	Graduated are able to share their knowledge to the industries as well as society.	Moderate	None	Slight	
11	PO 11	Graduated will be able to apply their skill and knowledge for the sustainable development of nation.	Slight	Slight	Slight	
12	PO 12	Graduated are able to learn to work with with the team and also with the inter discipliners.	None	Moderate	Slight	