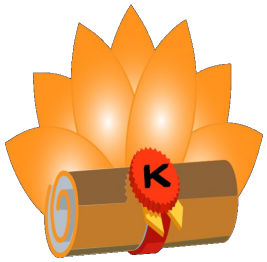
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Construction Materials — Complete Syllabus

BTEUP Diploma in Civil Engineering • 3rd Semester • Session 2026–27

Subject 3.1 (Practicum/Theory) • Total 100 Marks • 3 Credits • L 2 – P 2

Note: The 3rd-semester scheme totals imply this subject's 40 internal marks sit under Practical assessment (the extracted table's column alignment is garbled — see NOTES). The lab work listed here is part of subject 3.1 itself.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
3.1	Construction Materials	Practicum/ Theory	2 – 2	3	40	Theory 60 (3 hrs)	100
Construction Materials Total				**3**	**40**	**60**	**100**

What This Subject Aims To Do

To learn about various construction materials and their relevant characteristics, to judge which material suits which construction purpose, and to know the natural, artificial and processed materials available for construction work.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Overview of Construction Materials	4	15%
2	Natural Construction Materials	6	20%

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3	Artificial Construction Materials	8	30%
4	Special Construction Materials	4	15%
5	Processed Construction Materials	6	20%

Unit 1 — Overview of Construction Materials (4 Periods, 15%)

Topics: Scope of construction materials in Building Construction, Transportation Engineering, Environmental Engineering, Irrigation Engineering (applications only); selection of materials for different civil engineering structures on the basis of strength, durability, eco-friendly nature and economy; broad classification of materials — Natural, Artificial, special, finishing and recycled.

Unit 2 — Natural Construction Materials (6 Periods, 20%)

Topics: Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone; classification of rocks — geological, physical and chemical classification; structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber, use of bamboo in construction; asphalt, bitumen and tar used in construction, properties and uses; types of lime, properties of lime and uses, slaking of lime; properties of sand and uses; classification of aggregate according to size.

Unit 3 — Artificial Construction Materials (8 Periods, 30%)

Topics: Constituents of brick earth; conventional/traditional bricks, modular and standard bricks; special bricks — fly ash bricks; characteristics of good brick, field tests on bricks, classification of burnt clay bricks and their suitability; manufacturing process of burnt clay brick, fly ash bricks, aerated concrete blocks (AAC); flooring tiles — types, uses; manufacturing process of cement — dry and wet (only flow chart), types of cement and its uses, field tests on cement; pre-cast concrete blocks — hollow, solid, pavement blocks — and their uses; plywood, particle board, veneers, laminated board and their uses; types of glass — soda lime glass, lead glass, borosilicate glass, toughened glass, reinforced glass, fibre glass — and their uses; ferrous and non-ferrous metals and their uses.

Unit 4 — Special Construction Materials (4 Periods, 15%)

Topics: Types of material and suitability in construction works of: water proofing, termite proofing; thermal and sound insulating materials; fibres and its types — jute, glass, plastic, asbestos fibres (only uses).

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Unit 5 — Processed Construction Materials (6 Periods, 20%)

Topics: Constituents and uses of POP (Plaster of Paris), POP finishing boards, sizes and uses; gypsum and gypsum based material; paints — whitewash, cement paint, distempers, oil paints and varnishes — with their uses (situations where used); industrial waste materials — fly ash, blast furnace slag, granite and marble polishing waste — and their uses; agro waste materials — rice husk, bagasse, coir fibres — and their uses; special processed construction materials — geo-synthetic, ferrocrete, artificial timber, artificial sand — and their uses.

Practical Work

- Identify various sizes of available coarse aggregates from sample of 10 kg in laboratory and prepare report (60, 40, 20, 10 mm).
- Identify the available construction materials in the laboratory on the basis of their sources.
- Prepare the lime putty by mixing lime (1 kg) with water in appropriate proportion and prepare report on slaking of lime.
- Select first class, second class and third-class bricks from the stake of bricks and prepare report on the basis of its properties.
- Measure dimensions of 10 bricks and find average dimension and weight. Perform field tests — dropping, striking and scratching by nail — and correlate the results obtained.
- Identify different types of flooring tiles such as vitrified tiles, ceramic tiles, glazed tiles, mosaic tiles, anti-skid tiles, chequered tiles, paving blocks and prepare report about the specifications.
- Apply the relevant termite chemical on given damaged sample of timber.
- Identify the type of glasses from the given samples.
- To determine the compressing strength of bricks, CLC and AAC blocks.
- To determine the water absorption of bricks and efflorescence of bricks.
- Construct a brick masonary 3D models of Flemish / English bonds.
- Construct a 3D models on sustainable construction practices.

Reference Books (as listed in the syllabus)

- Ghose, D. N., Construction Materials, Tata McGraw Hill, New Delhi.
- S.K. Sharma, Civil Engineering Construction Materials, Khanna Publishing House, Delhi.
- Varghese, P.C., Building Materials, PHI learning, New Delhi.
- Rangwala, S.C., Engineering Materials, Charator publisher, Ahemdabad.
- Somayaji, Shan, Civil Engineering Materials, Pearson education, New Delhi.
- D.V.Gupta, Vikram Singh, Construction Materials, Asian Publishers, Muzaffarnagar, ISBN no. 978-93-5502-020-8.
- Rajput, R.K, Engineering Materials, S. Chand and Co., New Delhi.

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- Sood H., Laboratory Manual on Testing of Engineering Materials, New Age Publishers, New Delhi.
- Sharma C. P., Engineering Materials, PHI Learning, New Delhi.
- Duggal, S. K, Building Materials, New International, New Delhi.

Source: BTEUP 2nd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.

