



# Techno College of Engineering Agartala

An Engineering College Approved by AICTE, MHRD, Govt. of India

Affiliated to Tripura University (A Central University),

Department of Civil Engineering



## List of Laboratory Experiments

### Structural Engineering Lab

Course Code	Hours / Week				Maximum Marks		
	L	T	P	C	CIA	SEE	Total
PC CE 507	0	0	2	1	40	60	100

**Number of classes: 20 Hours**

**Prerequisites: NIL**

**Branch: CE**

**Semester: V**

#### Course overview:

This course provides hands-on experience and experimental understanding of the mechanical behavior and properties of construction materials and structural elements. This 1-credit laboratory course covers a wide spectrum of practical tests related to cement, concrete, bricks, and reinforcement bars, along with experiments on structural systems such as arches, frames, and RCC elements. Students engage in both basic material characterization and advanced structural behavior assessment, including verification of theoretical principles like Muller-Breslau's. The lab also encourages the integration of virtual laboratories to supplement physical experimentation where available.

#### Course objectives:

The primary objective of this course is to:

- Enable students to experimentally investigate the properties and behavior of fundamental construction materials such as cement, bricks, concrete, and reinforcing bars.
- Familiarize students with the load-response characteristics of structural elements like beams, slabs, arches, and frames, under different loading conditions.
- Develop analytical and critical thinking skills by observing, recording, and interpreting experimental data.
- Bridge the gap between theoretical structural analysis and real-world performance through laboratory validation of structural concepts and principles.
- Encourage the use of modern tools, such as virtual labs, to enhance experiential learning and adaptability to current technological practices in structural engineering.

#### Course outcomes:

CO Number	CO Description	K-level
CO-1	Review the physical behavior of cement and concrete	K-2
CO-2	Predict the behavior of arches and frame structures	K-3
CO-3	Compute the bond strength between steel bar and concrete	K-3
CO-4	Analyze the behavior of RCC structures	K-4
Sl. No.	EXPERIMENT NAME	CO
1.	Water content for standard consistency of cement.	CO-1
2.	Initial and final setting times of cement	CO-1
3.	Soundness of Cement by Le-Chatalier's Apparatus & Autoclave test method.	CO-1
4.	Compressive strength & tensile strength of cement.	CO-1



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5.	Water absorption, compressive strength of Bricks.	CO-1
6.	Behaviour of pre-stressed concrete beams in flexure.	CO-4
7.	Ultimate strength and deflection of R.C.C. slab.	CO-4
8.	Behaviour of under reinforced and over reinforced R.C. beams in flexure.	CO-4
9.	Behaviour of R.C. beams, with and without shear reinforcement in shear.	CO-4
10.	Bond strength between steel bar and concrete (a) in a beam specimen and (b) by pull-out test.	CO-3
11.	Two and Three hinged arch.	CO-4
12.	Verification of Muller-Breslau principle-Arch / continuous beam / frame models.	CO-2
13.	Fineness of cement by sieving & air permeability method.	CO-1
14.	Tensile and bend test of M.S and HYSD bar.	CO-1