

Program : <b>Diploma in Civil Engineering</b>	
Course Code : <b>6018</b>	Course Title: <b>Material Testing Lab (CE)</b>
Semester : <b>6</b>	Credits: <b>1.5</b>
Course Category: <b>Program Core</b>	
Periods per week: <b>3 (L:0, T:0, P:3)</b>	Periods per semester: <b>45</b>

### Course Objectives:

- To provide hands-on experience for the students to outline the basic mechanical properties of material.
- To impart the knowledge of material properties to identify and make use of it in various fields of engineering.

### Course Prerequisites:

Topic	Course code	Course name	Semester
Properties of materials, stress, strain concepts		Engineering mechanics	2
Shear force and bending moment diagram		Theory of Structures	4

### Course Outcomes:

On completion of the course, the student will be able to:

CO <sub>n</sub>	Description	Duration (Hours)	Cognitive level
CO1	Identify salient features of stress strain curve of mild steel and tor steel bars.	7	Applying
CO2	Compare compressive strength of various masonry blocks such as laterite, burnt bricks, solid and hollow concrete blocks, flyash blocks, Autoclaved Aerated Concrete (AAC) blocks, paver tiles etc.	14	Applying
CO3	Compare any three metals based on hardness, toughness shear strength and modulus of elasticity.	10	Applying
CO4	Compute flexural and compressive strength of wood.	10	Applying
	Series Test	4	

**CO-PO Mapping:**

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			3		2	
CO2	3			3		2	
CO3						2	
CO4				3		2	

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

**Course Outline:**

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	<b>Identify salient features of stress strain curve of mild steel and tor steel bars.</b>		
M1.01	Study and understand the use and components of Universal Testing Machine (UTM).	1	Understanding
M1.02	Perform Tension test on mild steel as per IS:432(1).	3	Applying
M1.03	Perform tension test on Tor steel as per IS:1608, IS: 1139.	3	Applying
CO2	<b>Compare compressive strength and water absorption properties of dry and wet blocks.</b>		
M2.01	Determine Water Absorption on bricks per IS:3495 (part II), IS:1077 or tile IS:1237.	2	Applying
M2.02	Determine Compressive strength of dry and wet bricks as per IS:3495 (part I), IS:1077.	2	Applying
M2.03	Determine Compressive strength of laterite block as per IS: 3620 (part I), IS:1077.	2	Applying
M2.04	Determine Compressive strength hollow concrete block IS: 2185 (part I).	2	Applying
M2.05	Determine Compressive solid concrete block as per IS: 2185 (part I).	2	Applying
M2.06	Determine Compressive strength of fly ash blocks and AAC blocks.	2	Applying
M2.07	Determine Compressive strength of paving tiles as per IS: 15658.	2	Applying
	Lab Test I	2	

<b>CO3</b>	<b>Compare hardness, toughness and shear strength of any three metals.</b>		
M3.01	Conduct Charpy Impact test on three metals. e.g. mild steel/ brass/aluminum/ copper /cast iron	2	Applying
M3.02	Conduct Izod Impact test on three metals. e.g. mild steel/ brass/aluminum/ copper /cast iron etc as per IS:1598.	2	Applying
M3.03	Perform Single Shear or double shear test on any two metals e.g. Mild steel/ brass/aluminum/copper / cast iron etc as per IS:5242.	2	Applying
M3.04	Conduct hardness test on three metals. e.g. mild steel/ brass/aluminum/ copper /cast iron	2	Applying
M3.05	Conduct deflection test on three metals. e.g. mild steel/ brass/aluminum/ copper /cast iron to find modulus of elasticity.	2	Applying
<b>CO4</b>	<b>Conduct flexural and compression test on wood.</b>		
M4.01	Conduct Compression test on timber section along the grain and across the grain as per IS:2408.	3	Applying
M4.02	Conduct Flexural test on timber beam on rectangular section as per IS:1708, IS:2408.	3	Applying
M4.03	Open ended experiments	4	
	Lab Test II	2	

**Text / Reference:**

<b>T/R</b>	<b>Book Title/Author</b>
T1	Bedi D.S., Strength of Materials, Khanna Publishing House, Delhi, Ed. 2018
T2	Khurmi, R.S., Strength of Materials, S Chand and Co. Ltd. New Delhi.
R1	Ramamurtham, S, Strength of Materials, Dhanpat Rai and sons, New Delhi.
	Punmia B C, Strength of Materials, Laxmi Publications (p) Ltd. New Delhi.
R2	Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.
R3	Rattan S.S., Strength of Materials, McGraw Hill Education; New Delhi.
R4	Bansal R K, Strength of Materials, Laxmi Publications.
R5	Subramaniam R, Strength of Materials, Oxford University Press.

**Online Resources:**

<b>Sl.No</b>	<b>Website Link</b>
1	<a href="https://www.nptel.ac.in/courses/122104015/">https://www.nptel.ac.in/courses/122104015/</a>
2	<a href="https://nptel.ac.in/courses/112103109/">https://nptel.ac.in/courses/112103109/</a>
3	<a href="http://vlab.co.in/">http://vlab.co.in/</a>