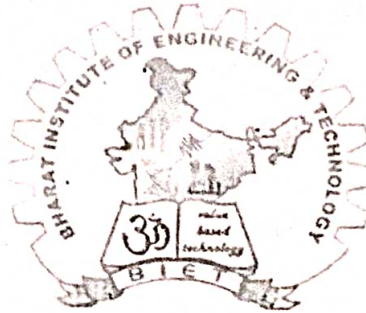


# BHARAT INSTITUTE OF ENGINEERING & TECHNOLOGY

**SIVARAM VIHAR, GHATAKESWAR HILLS  
MOHADA, BERHAMPUR (GM.)**



## STUDENT'S ATTENDANCE REGISTER

Time	9.55	10.45	11.30		
Day	10.45	11.30	12.25		
Mon			✓		
Tue					
Wed					
Thu		✓			
Fri	✓				
Sat	✓	✓			

Year/ Session : 2023 (winter)

Semester from Date: 01/08/2023 To Date : 30/11/2023

Semester & Branch

*3<sup>rd</sup> Sem, Civil*

Subject with Code

*Th-01. Structural mechanics.*

Name of the Faculty Member

*Bipin Kumar Dey*

No of Weeks:

No of Class Allotted/Week :



# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
August		3.8.23	1) <u>Review of basic concepts</u> of <u>Basic principle of mechanics:</u>
		4.8.23	force, moment, support condition, Conditions of equilibrium, CG & MD, free body diagram.
		5.8.23	ii) <u>Review of CG and MD of</u> different sections.
		5.8.23	2) <u>Simple and complex stress,</u> <u>Strain</u> ii) <u>Introduction to stresses and</u> <u>strains</u> :-
August		7.8.23	3) <u>Mechanical properties of material</u> rigidity, elasticity, plasticity, compressibility; hardness, tough- ness, stiffness, Brittleness, ductility
		10.8.23	Malleability, creep, Fatigue, tenacity, ductility etc.

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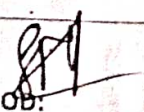
# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
August		11.8.23	→ <u>Types of stresses</u> :- Tensile, compressive & shear stress.
		12.8.23	→ <u>Types of strains</u> :- Tensile, compressive & shear strain.
		12.8.23	Complimentary shear stress, elongation and contraction, longitudinal and lateral strain, Poissons ratio, volumetric strain.
		14.8.23	Computation of stress, strain, derivation of relationship between the Elastic constant.
August		17.8.23	Application of simple stress and strain in <u>Engineering</u> .

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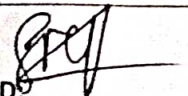
# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
August		18.8.23	Behaviour of ductile & brittle Materials under direct loads,
		19.8.23	Stress strain curve of a ductile Material, limit of proportionality, Elastic limit, yield stress,
		19.8.23	ultimate stress, breaking stress, Percentage elongation, percentage
		21.8.23	reduction in area, significance of percentage elongation & reduction in area of cross
		24.8.23	section, deformation of prismatic bars due to uniaxial load,
August		25.8.23	deformation of prismatic bars due to its self weight.
		26.8.23	iii) <u>Complex stress &amp; strain</u> → Principal stresses & strains :- occurrence of normal & tangential stresses, concept of principal stress & principal planes

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# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
August		26.8.23	Major & Minor principal stresses and their orientation, Mohr's circle & its application to solve problems of complex stresses.  <u>3) Stresses in beams in shaft</u> <u>4) Stresses in beams due to bending</u>
August		27.8.23	<u>5) Bending stress in beams - theory of simple bending</u> Assumption, moment of resistance, equation for flexure, flexural stress distribution, curvature of beam, position of N.A & centroidal axis - flexural rigidity, significance of section modulus.
August		28.8.23	(Continuation of Bending stress in beams)

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# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
September			<p>1) <u>Shear stresses in beams</u>:-</p> <p>31-8-23 → Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis.</p>
		1.9.23	<p>2) <u>Stresses in shafts due to torsion</u>:-</p> <p>→ Concept of torsion, basic assumptions of pure torsion, torsion of solid and hollow circular sections, polar moment of inertia, torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion.</p>
September		2.9.23	
		2.9.23	
		4.9.23	<p>3) <u>Combined bending &amp; direct stresses</u></p> <p>→ Combination of stresses, combined direct &amp; bending stresses, maximum &amp; minimum stresses on section,</p>
		7.9.23	

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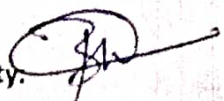




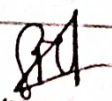
# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
September		8.9.23	condition for no tension, limit of eccentricity, middle third / fourth rule, core of kern. of sq, square, rectangular and circular sections, chimneys, dams & retaining walls.
		9.9.23	4) <u>Columns &amp; struts</u>
		9.9.23	7) columns & struts, determinate short and long columns, End conditions, Equivalent length / effective length, slenderness ratio, axially loaded short & long column.
		11.9.23	Euler's theory of long column
September		14.9.23	critical load for columns with different end conditions
		15.9.23	

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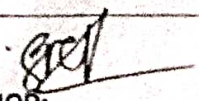
# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
September			5) <u>Shear force &amp; bending moment</u>
		16.9.23	Types of <u>loads &amp; beams</u> :-
		16.9.23	→ Types of loads :- concentrated or point load, uniformly distributed load.
		18.9.23	→ Types of support :- Simple support, Roller support, hinged support, fixed support.
		21.9.23	→ Types of reaction :- Vertical, horizontal reaction, moment reaction.
September		22.9.23	Calculation of support reactions using equations of static equilibrium.
		22.9.23	→ <u>Shear force and bending moment in beams</u> :-
		23.9.23	Shear force & bending moment: Signs convention for SF & BM.
		23.9.23	

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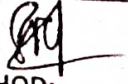




# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic	Mon
September		25.9.23	S.F & BM of general cases of determinate beams with concentrated loads & udl	oc
		30.9.23	only, S.F & BM diagrams for cantilevers, simply supported beams & over hanging beams.	
		30.9.23	Position of maximum B.M., Plot of contra flexure, relation between intensity of load, S.F. & B.M.	
		5.10.23	S.F. & B.M.	
October		6.10.23	6/ Slope & <u>Deflection</u>	
		7.10.23	7/ <u>Introduction</u> : Shape & nature of elastic curve, relationship between slope, deflection & curvature, importance of Slope & deflection.	
		7.10.23		
		9.10.23		
		12.10.23		
		13.10.23	11/ Slope & deflection of cantilever	

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# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
October		16-10-23	and simply supported beams
		19-10-23	under concentrated and
		30-10-23	uniformly distributed load.
		2-11-23	(by double integration & Macaulay's method)
		3-11-23	7/ <u>Indeterminate beams</u>
		4-11-23	8/ <u>Indeterminacy in beams,</u>
		4-11-23	Principle of consistent deformation/compatibility, analysis of propped cantilever,
November		6-11-23	of fixed & span continuous beams by principle of superposition; SF & BM (diagrams)
		9-11-23	
		10-11-23	
		11-11-23	
		11-11-23	
		13-11-23	
November		16-11-23	8/ <u>Trusses:-</u>
		17-11-23	9/ <u>Introduction:-</u>
		18-11-23	Types of trusses, statically determinate & indeterminate
		18-11-23	

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# B.I.E.T., COURSE PLAN

Month	Week	Class Day	Theory/Practical Topic
November		20.11.23	- Trusses, degree of indeterminacy, stable & unstable
		20.11.23	
		29.11.23	- Trusses, advantages of trusses
		28.11.23	" <u>Analysis of trusses</u> :- analytical Method - > Method of joint - > Method of section.
		25.11.23	
		25.11.23	
		30.11.23	

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