

DHABALESWAR INSTITUTE OF POLYTECHNIC

LESSON PLAN

Discipline <u>Civil</u>	Semester <u>3rd</u>	Name of the Teaching Faculty <u>Subhansu K. Muduli</u>
Subject <u>SM</u>	No. of days per Week Class Alloted	Semester from Dt. <u>01/10/22</u> To Dt. <u>08/01/22</u> No. of Weeks: <u>14</u>
Week	Class Day	☒ Theory / Practical Topics
<u>1st</u>	<u>1st</u>	1. <u>INTRODUCTION TO STRUCTURAL MECHANICS:</u>
	<u>2nd</u>	1.1. Basic principle of Mechanics. Force, Moment, Support conditions
	<u>3rd</u>	1.2. Equilibrium and its conditions.
	<u>4th</u>	1.3. Centre of gravity and concept of CG point in different bodies (Sections).
	<u>5th</u>	1.4. Moment of Inertia and MI of different Sections.
<u>2nd</u>	<u>DASAHARRA HOLIDAY</u>	1.5. Free body Diagram concept.
<u>3rd</u>	<u>1st</u>	1.6. Problems related to CG and MI in different Sections.
	<u>2nd</u>	1.7. class Test and Revision.
	<u>3rd</u>	2. <u>SIMPLE STRESSES & STRAIN:</u>
	<u>4th</u>	2.1. Introduction to Stress and Strain.
	<u>1st</u>	2.2. Types of stresses and strains.
	<u>2nd</u>	2.3. Mechanical properties of Materials.
<u>4th</u>	<u>3rd</u>	2.4. Elongation and contraction
	<u>4th</u>	2.5. Poisson's ratio, volumetric Strain, Different stress, Strain concept.
		2.6. Hooke's law, Elastic constants
		2.7. Mathematical problem related to Young's Modulus.

LESSON PROGRESS

Date	Topic to be covered as per Lesson plan	Topic actually covered	Point / Contents Discussed (in brief)	Sign. of Teacher
04.10.21	Basic Introduction to Mechanics and its components.	All covered	Basic Mechanics, Force, Moment.	<u>Intk</u>
05.10.21	Concept of Equilibrium	All covered	Equilibrium concept.	<u>Intk</u>
5.10.21	Centre of gravity and Cg points of diff. Section	All covered	Centre of gravity and with diff. section	<u>Intk</u>
7.10.21	Concept of Moment of Inertia and with different types of section	All covered	Moment of Inertia	<u>Intk</u>
8.10.21	Force body diagram.	All covered	Free body Diagram	<u>Intk</u>
9.10.21	Mathematical Problem related to Cg and MI.	All covered	Mathematical problem related to Cg and MI	<u>Intk</u>
9.10.21	Class Test and Revision	Class test	Class Test —	<u>Intk</u>
21.10.21	Introduction to Stress and Strain.	All covered	Stress and Strain	<u>Intk</u>
22.10.21	Different types of Stress and Strain.	All covered	Diff. types of Stress and Strain	<u>Intk</u>
23.10.21	Mechanical Properties of Materials.	All covered	Mechanical properties of Material.	<u>Intk</u>
25.10.21	Concept of elongation and contraction.	All covered	Elongation and contraction.	<u>Intk</u>
26.10.21	Poisson's ratio, Diff. Strain and Stress.	All covered	Poisson's ratio	<u>Intk</u>
27.10.21	Hooke's law, Elastic Constants.	All covered	Hooke's law and Elastic constants.	<u>Intk</u>
28.10.21	Young's Modulus related problem.	All covered	Young's Modulus.	<u>Intk</u>

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Subject <u>SM</u>	No. of days per Week Class Alloted	Semester from Dt. _____ To Dt. _____ No. of Weeks: _____
Week	Class Day	Theory / Practical Topics
<u>5TH</u>	5 TH	<u>3. APPLICATION OF SIMPLE STRESS AND STRAIN :</u>
	1 st	3.1. Behaviours of ductile and brittle materials under direct loads.
	2 nd	3.2. Stress - Strain curve
	3 rd	3.3. Discussion about Elastic limit, Yield Stress, ultimate stress.
	4 th	3.4. Percentage of elongation, reduction in area.
	5 th	3.5. Deformation of prismatic bars due to uniaxial load.
<u>6TH</u>	1 st	3.6. Deformation of prismatic bars due to its self weight.
	2 nd	<u>4. COMPLEX STRESS AND STRAIN :</u>
	3 rd	4.1. Introduction to principal stress and strains.
	4 th	4.2. Concept of principal stress and principal planes.
<u>7TH</u>	1 st	4.3. Major and Minor principal stresses and their problems.
	2 nd	4.4. Mohr's circle concept
	3 rd	4.5. Mohr's circle application and problems.
		4.6. Mathematical problem Solving.

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Date	Topic to be covered as per Lesson plan	Topic actually covered	Point / Contents Discussed (in brief)	Sign. of Teacher
29.10.21	Behaviour of Ductile and brittle Material under direct loads.	All covered	Ductile and Brittle Material.	<i>South</i>
30.10.21	Stress-Strain Curve	All covered	Stress-Strain Curve.	<i>South</i>
1.11.21	Elastic Limit, Yield-Stress, Ultimate Stress.	All covered	Elastic Limit, Yield Stress.	<i>South</i>
2.11.21	Percentage of elongation reduction in Area.	All covered	Elongation and Reduction.	<i>South</i>
3.11.21	Deformation of prismatic bars due to uniaxial load.	All covered	Prismatic bars deformation (UL)	<i>South</i>
5.11.21	Deformation of prismatic bars due to its self weight.	All covered	Prismatic bars deformation (SW)	<i>South</i>
6.11.21	Introduction to Principal stress and Strains.	All covered	Principal stress and Strains.	<i>South</i>
6.11.21	Concept of principal stress and principal planes.	All covered	Principal stress and principal planes	<i>South</i>
8.11.21	Major and Minor Principal Stresses.	All covered	Major and Minor Principal stresses.	<i>South</i>
9.11.21	Mohr's circle concept	All covered	Mohr's circle	<i>South</i>
10.11.21	Application and Problems of Mohr's circle.	All covered	Problems related to Mohr's circle	<i>South</i>
11.11.21	Question-Answer Discussion.	Question-Answer Discussion.	Question-Answer Discussion.	<i>South</i>

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Week	Class Day	Theory / Practical Topics
<u>8TH</u>	4 th	5. <u>STRESS IN BEAMS :</u> 5.1. Introduction to bending, Stress in beams.
	1 st	5.2. Theory of simple bending, Assumptions.
	2 nd	5.3. Moment of resistance
	3 rd	5.4. Concept about Flexural Stress and its distribution.
	4 th	5.5. Curvature of beam.
	5 th	5.6. Neutral Axis and Centroidal axis.
	6 th	5.7. Flexural rigidity and Significance of Section Modulus.
<u>9TH</u>	1 st	6. <u>SHEAR STRESSES IN BEAMS :</u> 6.1. Shear Stress distribution in beams of rectangular
	2 nd	6.2. stress distribution in beams of circular.
	3 rd	6.3. problems related to Shear Stress distribution.
	4 th	6.4. Standard Sections Symmetrical about Vertical axis.
	5 th	7. <u>STRESSES IN SHAFT DUE TO TORSION :</u> 7.1. concept of torsion and basic assumptions.

LESSON PROGRESS

Date	Topic to be covered as per Lesson plan	Topic actually covered	Point / Contents Discussed (in brief)	Sign. of Teacher
15.11.21	Introduction to bending Stress in beams.	All covered	Introduction to Bending Stress.	<i>hith</i>
16.11.21	Theory of Simple bending Assumptions.	All covered	Theory of Simple bending.	<i>hith</i>
18.11.21	Moment of diff. resistance.	All covered	Moment of diff. resistance.	<i>hith</i>
20.11.21	concept about flexural Stress and its distribut.	All covered	Flexural stress.	<i>hith</i>
22.11.21	curvature of beam	All covered	curvature of Beam.	<i>hith</i>
	Neutral axis and Centroidal axis.	All covered	Neutral axis and Centroidal axis.	<i>hith</i>
23.11.21	flexural rigidity and Significance Section of Modulus.	All covered	Flexural rigidity and Section Modulus.	<i>hith</i>
24.11.21	Shear stress distribution in beams of Rectangular.	All covered	Shear-Stress distribution in rectangular beam.	<i>hith</i>
25.11.21	Stress distribution in beams of circular	All covered	Stress distribution in beams of circular	<i>hith</i>
28.11.21	Problems related to Shear-stress.	All covered	Problems related to Shear-stress.	<i>hith</i>
29.11.21	Standard Sections Symmetrical about Vertical axis.	All covered	Standard Sections Symmetrical about Vertical axis.	<i>hith</i>
30.11.21	concept of torsion and its basic assumptions.	All covered	concept of torsion and its basic assumptions.	<i>hith</i>

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Subject <u>SM</u>	No. of days per Week Class Alloted	Semester from Dt. _____ To Dt. _____ No. of Weeks: _____
Week	Class Day	Theory / Practical Topics
<u>10TH</u>	1 st	7.2. Torsion of solid and hollow circular sections.
	2 nd	7.3. Problems related to torsion
	3 rd	7.4. Polar Moment of Inertia.
	4 th	7.5. Torsional Shearing Stresses, Angle of twist.
	5 th	7.6. Torsional Rigidity and Discussion about previous part.
		7.7. Equation of torsion and Discussion.
<u>11TH</u>	1 st	8. <u>COMBINED BENDING AND DIRECT STRESSES:</u>
	2 nd	8.1. Concept about combination of stresses, combined direct and bending stresses.
	3 rd	8.2. Maximum and Minimum stresses in sections.
	4 th	8.3. Limit of eccentricity.
	5 th	8.4. Middle 3 rd /4 th rule.
	6 th	8.5. Core of different sections.
		8.6. Some theory about Dams and retaining walls.
		8.7. Discussions about previous concepts.
<u>12TH</u>	1 st	8.8. Class Test

LESSON PROGRESS

Date	Topic to be covered as per Lesson plan	Topic actually covered	Point / Contents Discussed (in brief)	Sign. of Teacher
1.12.21	Torsion of solid and hollow circular sections.	All covered	Torsion of solid and hollow circular sections.	huth
2.12.21	Problem related to torsion.	All covered	Problem related to torsion.	huth
3.12.21	Polar Moment of Inertia	All covered	Polar Moment of Inertia.	huth
4.12.21	Torsional shearing stress, Angle of twist	All covered	Torsional shearing.	huth
5.12.21	Torsional rigidity and its problem.	All covered	Torsional rigidity.	huth
7.12.21	Equation of torsion and Discussion.	All covered	Equation of torsion	huth
8.12.21	Problems related to All.	All covered	Question-Answer Solving.	huth
9.12.21	Concept about combination of stress, combined direct and Bs.	All covered	Combination of stress, Bending stress.	huth
10.12.21	Maximum and min. stresses.	All covered	Maximum and Minimum stress.	huth
11.12.21	Limit of Eccentricity	All covered	Limit of Eccentricity	huth
12.12.21	Middle 3 rd /4 th rule.	All covered	Middle 3 rd /4 th rule.	huth
14.12.21	Core of diff. sections	All covered	core of diff. sections	huth
16.12.21	Theory about Dams and retaining walls.	All covered	Theory about Dams.	huth
18.12.21	Discussions and Question-Answer Solve.	All covered	Question-Answer Discussion.	huth
20.12.21	Class Test	Class Test	Class Test	huth

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Subject <u>SM</u>	No. of days per Week Class Alloted	Semester from Dt. _____ To Dt. _____ No. of Weeks: _____
Week	Class Day	☒ Theory / Practical Topics
<u>13TH</u>	2 nd	9. <u>COLUMNS AND STRUTS</u> :
	3 rd	9.1. Definition of columns and struts with some basic concepts.
	4 th	9.2. Short and long columns.
	5 th	9.3. End conditions and effective length concept.
	1 st	9.4. Slenderness ratio with some related concept.
	2 nd	9.5. Euler's theory.
	3 rd	9.6. Critical load for columns with different end conditions.
		9.7. Problems and Discussion.
		10. <u>SHEAR FORCE AND BENDING MOMENT</u>
	4 th	10.1. Types of loads and their concept.
<u>14TH</u>	5 th	10.2. Types of Reactions. Vertical, Horizontal, Moment
	1 st	10.3. Types of beams based on support conditions.
	2 nd	10.4. Calculations of support reactions using equations of static equilibrium.
	3 rd	10.5. Problems and Discussions.

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Date	Topic to be covered as per Lesson plan	Topic actually covered	Point / Contents Discussed (in brief)	Sign. of Teacher
21.12.21	Defination of columns and Struts.	All covered	Columns and Struts.	<i>Smith</i>
22.12.21	Short and long Columns.	All covered	Short and long Column.	<i>Smith</i>
23.12.21	End conditions and effective length.	All covered	Effective length	<i>Smith</i>
24.12.21	Slenderness ratio and its problem	All covered	Slenderness ratio and its problem	<i>Smith</i>
24.12.21	Euler's theory.	All covered	Euler's Theory	<i>Smith</i>
25.12.21	Critical load for Columns.	All covered	Critical load for Columns.	<i>Smith</i>
24.12.21	Problems and Disussions.	All covered	Problems and Disussions.	<i>Smith</i>
24.12.21	Types of loads and their concept.	All covered	Types of loads and their concept	<i>Smith</i>
30.12.21	Types of reactions, Vertical, Horizontal.	All covered	Types of Reactions	<i>Smith</i>
30.12.21	Types of beams based on Support conditions.	All covered	Types of Beams, based on Support conditions.	<i>Smith</i>
31.12.21	Calculations of Support reactions. using Equations of Static equilibrium.	All covered	Calculation of Support reactions	<i>Smith</i>
31.12.21		All covered	Static equilibrium	<i>Smith</i>
31.12.21	Problems and Disussions.	All covered	Problem and Question Answer Disussion	<i>Smith</i>

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Subject <u>SM</u>	No. of days per Week Class Alloted	Semester from Dt. _____ To Dt. _____ No. of Weeks: _____
Week	Class Day	☒ Theory / Practical Topics
<u>15TH</u>	4 th	11. <u>SHEAR FORCE AND BM :</u>
	5 th	11.1. Introduction and sign convention for shear force and Bending Moment.
	6 th	11.2. Beams with concentrated loads and UDL.
	1 st	11.3. S.F and B.M. diagrams for cantilevers.
	2 nd	11.4. Simply Supported beams and over hanging beams.
	3 rd	11.5. Problems and Discussions.
		11.6. point of contraflexure.
<u>16TH</u>		11.7. Relation between intensity of load.
	4 th	12. <u>SLOPE AND DEFLECTION :</u>
	5 th	12.1. Introduction to deflection curve.
	6 th	12.2. Relationship between slope.
		12.3. Deflection and curvature.
	1 st	12.4. Problems related to deflections of cantilever and simply supported beams.
	2 nd	12.5. Problems related to Double Integration Method and Macaulay's Method.
		13. <u>TRUSSES</u> : Introduction and problems

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Date	Topic to be covered as per Lesson plan	Topic actually covered	Point / Contents Discussed (in brief)	Sign. of Teacher
03.01.22	Introduction and sign convention for shear force and BM	All covered	Sign convention for shear force and B.M.	<u>huth</u>
04.01.22	Beams with diff. Loads.	All covered	Beams with diff. Loads.	<u>huth</u>
05.01.22	S.F. and B.M. diagrams for cantilevers.	All covered	S.F. and B.M. diagrams for cantilevers.	<u>huth</u>
06.01.22	Simply supported beams and over hanging beams	All covered	Simply supported beams.	<u>huth</u>
07.01.22	Problems and Discussions.	All covered	Problems and Discussions.	<u>huth</u>
07.01.22	point of contraflexure	All covered	point of contraflexure	<u>huth</u>
07.01.22	Relation between intensity of load.	All covered	Relation between Intensity of load	<u>huth</u>
08.01.22	Introduction to deflection curve.	All covered	Introduction to deflection curve.	<u>huth</u>
08.01.22	Relationship between Slope.	All covered	Relationship between slope.	<u>huth</u>
09.01.22	Deflection and curve.	All covered	Deflection and curve.	<u>huth</u>
09.01.22	Problems related to deflections.	All covered	Problems related to deflections.	<u>huth</u>
10.01.22	problems related to DIM and Macaulay's Method	All covered All covered	Problems related, to DIM and Macaulay's Method.	<u>huth</u>
10.01.22 11.01.22	Truss and Their problems.	All covered	Truss and its related problem.	<u>huth</u>

STATE OF NEW YORK

No.	Name	Residence	Occupation
1	John Smith	New York	Merchant
2	Jane Doe	New York	Housewife
3	Robert Johnson	New York	Lawyer
4	Mary White	New York	Teacher
5	William Brown	New York	Farmer
6	Elizabeth Black	New York	Shopkeeper
7	Thomas Green	New York	Physician
8	Ann Miller	New York	Widow
9	James Wilson	New York	Blacksmith
10	Rebecca Taylor	New York	Milliner
11	George Evans	New York	Bookkeeper
12	Charlotte Adams	New York	Seamstress
13	Henry Clark	New York	Butcher
14	Frances Lewis	New York	Widow
15	Charles King	New York	Druggist
16	Harriet Hall	New York	Widow
17	Samuel Young	New York	Printer
18	Abigail Scott	New York	Widow
19	Benjamin Reed	New York	Farmer
20	Esther Cook	New York	Widow
21	David Baker	New York	Blacksmith
22	Julia Green	New York	Widow
23	Samuel Hall	New York	Farmer
24	Elizabeth King	New York	Widow
25	Thomas Lee	New York	Blacksmith
26	Ann Miller	New York	Widow
27	James Wilson	New York	Blacksmith
28	Rebecca Taylor	New York	Widow
29	George Evans	New York	Blacksmith
30	Charlotte Adams	New York	Widow