MERI College of Engineering and Technology
(MERI - CET)

Session: 2020-21

Lesson plan

Department: Mechanical Engineering
Semester: 5th & 7th
Subject Code: PCC-ME-303G & ME-401-F

Course: B. Tech
Subject Name: Strength of Materials-II & Solid Mechanics
Faculty Name: Er. Sandeep Chhillar

Lesson Plan File

Academic Session: 2020-21
Branch Name: Mechanical Engineering
Paper Code: PCC-ME-303G & ME-401-F
Faculty Name: Er. Sandeep Chhillar

Semester: 5th & 7th
Name of the Subject allocated: SOM-II & SM
Lectures Per Week: 2
Signature: …….

H.O.D.'s Remarks & Signature

Signature

Registrar **Director**

MERI College of Engineering and Technology
(MERI - CET)

Session: 2020-21

Lesson plan

(DEPARTMENT OF MECHANICAL ENGINEERING)

LESSON PLAN FILE

Name of the Faculty: Er. SANDEEP CHHILLAR

Semester: 5th & 7th

Subject: STRENGTH OF MATERIALS-II & SOLID MECHANICS

INDEX

MERI College of Engineering and Technology
(MERI - CET)

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Lesson plan

(5th Semester Mechanical Engg.(SM) syllabus as per MDU)

PCC-ME-303G

UNIT-I

Strain Energy & Impact Loading: Definitions, expressions for strain energy stored in a body when load is applied (i) gradually, (ii) suddenly and (iii) with impact, strain energy of beams in bending, beam deflections, strain energy of shafts in twisting, energy methods in determining spring deflection, Castigliano's & Maxwell's theorems, Numericals.

Theories of Elastic Failure: Various theories of elastic failures with derivations and graphical representations, applications to problems of 2- dimensional stress system with (i) Combined direct loading and bending, and (ii) combined torsional and direct loading, Numericals.

UNIT-II

Unsymmetrical Bending: Properties of beam cross section, product of inertia, ellipse of inertia, slope of the neutral axis, stresses & deflections, shear center and the flexural axis Numericals.

Springs: Stresses in open coiled helical spring subjected to axial loads and twisting couples, leaf springs, flat spiral springs, concentric springs, Numericals.

UNIT-III

Derivation of Lame's equations, Radial & Hoop Stresses in compound spherical shells subjected to internal fluid pressure only, wire wound cylinders, hub shrunk on solid shaft, Numericals. Rotating Rims & Discs: Stresses in uniform rotating rings & discs, rotating discs of uniform strength, stresses in (I) rotating rims, neglecting the effect of spokes, (ii) rotating cylinders, hollow cylinders & solids cylinders, Numerical.

UNIT-IV

Bending of Curved Bars : Stresses in bars of initial large radius of curvature, bars of initial small radius of curvature, stresses in crane hooks, rings of circular & trapezoidal sections, deflection of curved bars & rings, deflection of rings by Castiglione's theorem stresses in simple chain link, deflection of simple chain links, Problems.

MERI College of Engineering and Technology
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Session: 2020-21

Lesson plan

(7th Semester Mechanical Engineering (SOM-II) syllabus as per MDU)

ME-401-F

SECTION A

Strain Energy & Impact Loading: Definitions, expressions for strain energy stored in a body when load is applied (i) gradually, (ii) suddenly and (iii) with impact, strain energy of beams in bending, beam deflections, strain energy of shafts in twisting, energy methods in determining spring deflection, Castigliano's & Maxwell's theorems, Numericals.

Theories of Elastic Failure: Various theories of elastic failures with derivations and graphical representations, applications to problems of 2- dimensional stress system with (i) Combined direct loading and bending, and (ii) combined torsional and direct loading, Numericals.

SECTION B

Unsymmetrical Bending: Properties of beam cross section, product of inertia, ellipse of inertia, slope of the neutral axis, stresses & deflections, shear center and the flexural axis Numericals.

Thin Walled Vessels : Hoop & Longitudinal stresses & strains in cylindrical & spherical vessels & their derivations under internal pressure, wire would cylinders, Numericals.

SECTION C

Thick Cylinders & Spheres : Derivation of Lame's equations, radial & hoop stresses and strains in thick, and compound cylinders and spherical shells subjected to internal fluid pressure only, wire wound cylinders, hub shrunk on solid shaft, Numericals.

Rotating Rims & Discs: Stresses in uniform rotating rings & discs, rotating discs of uniform strength, stresses in (I) rotating rims, neglecting the effect of spokes, (ii) rotating cylinders, hollow cylinders & solids cylinders. Numericals.

SECTION D

Bending of Curved Bars : Stresses in bars of initial large radius of curvature, bars of initial small radius of curvature, stresses in crane hooks, rings of circular & trapezoidal sections, deflection of curved bars & rings, deflection of rings by Castigliano's theorem stresses in simple chain link, deflection of simple chain links, Problems.
Springs: Stresses in open coiled helical spring subjected to axial loads and twisting couples, leaf springs, flat spiral springs, concentric springs, Numericals.

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Lesson plan

Strength of Materials-II & Solid Mechanics

B.Tech.5th &7th SEMESTER (Mechanical Engineering)
Course Lecturer- Er. SANDEEP CHHILLAR

COURSE OBJECTIVE-

In the subject's students are able to learn and understand the following:
The objective is to present the mathematical and physical principles in understanding the linear continuum behaviour of solids. Apply and use energy methods to find force, stress and displacement in simple structures and springs. Understand and determine the stresses and strains in pressure vessels. Knowledge of stress functions, and calculates stresses in rotating rings, discs, and curved beams.

METHODOLOGY-

i. The pedagogy will be lectures and assignments.
ii. Audio – Visual aids will be used during the course.
iii. Surprise tests and Quiz
iv. Industrial visits and seminars

EVALUATION-

Besides the semester end – examination, the students will be continuously assessed during the course on the following basis:

7th semester

i. Internal Assessment: 50 Marks
ii. Mid Term Examinations: 20 Marks
(Assignments: 10 Marks)
(Attendance: 20 Marks)
iii. End Semester Examination: 100 Marks
Total: 150Mark

5th semester

iv. Internal Assessment: 25 Marks
v. Mid Term Examinations: 15 Marks
(Assignments: 05 Marks)
(Attendance: 05 Marks)
vi. End Semester Examination: 75 Marks
Total: 100 Marks

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Lesson plan

Strength of Materials-II & Solid Mechanics

PCC-ME-303G & ME-401-F
B. TECH MECH. 5th & 7th SEMESTER

IMPORTANT TOPICS OF
(SOM-II & SM)

SECTION-A	SECTION-B	SECTION-C	SECTION-D
1. Strain energy when load applied (i) gradually (ii) suddenly (iii) with impact. 2. Bending in beams. 3. Castiglione's & Maxwell's Theorem 4. Theories of elastic failures 5. Explain combined direct loading and bending	1. Unsymmetrical bending of beam cross section 2. Inertia, product of inertia & ellipse 3. Slope of neutral axis 4. Stress & deflections 5. Open coiled helical springs subjected to axial loads & twisting couples 6. Leaf spring, flat spiral springs& concentric springs	**1.** Lame's equation **2.** Radial & hoop stresses in compound spherical shells **3.** Wire wound cylinders **4.** Hub shrunk on solid shaft **5.** Stress in uniform rotating rings & discs	**1.** Stresses in bars of initial large& small radius of curvature **2.** stresses in crane hooks **3.** deflection of curved bars & rings **4.** deflection of simple chain links