**Lesson Plan**

**Name of faculty: Dr. Sunil Luthra**

**Discipline: Mechanical**

**Semester: 4th**

**Subject: Mechanics of Solids - II (Only Theory Subject)**

Lesson Plan Duration: 15 weeks (from January, 2018 to April, 2018)

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| **Week** | **Theory** |
|  | **Lecture day** | **Topic(Including assignment/ test)** |
| 1st |  | **Chapter 1 : 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 |
| 2nd |  | Strain energy of beams in bending, beam deflections |
|  | Strain energy of shafts in twisting, energy methods in determining spring deflection |
|  |  Castigliano’s theorem, Numericals |
| 3rd |  | **Chapter 2 : Theories of Elastic Failure:** Various theories of elastic failures with derivations and graphical representations |
|  | Theories of elastic failures with derivations and graphical representations |
|  | Applications to problems of 2- dimensional stress system with (i) Combined direct loading and bending, Numerical **Tutorial Sheet 1** |
| 4th |  | Applications to problems of 2- dimensional stress system with (i) Combined direct loading and bending, Numerical |
|  | Applications to problems of 2- dimensional stress system with (ii) combined torsional and direct loading, Numerical |
|  | Applications to problems of 2- dimensional stress system with (ii) combined torsional and direct loading, Numerical |
| 5th |  | **Chapter 3: Thin Walled Vessels:** Hoop & Longitudinal stresses & strains in cylindrical vessels  |
|  | Hoop & Longitudinal stresses & strains in spherical vessels |
|  | Derivations under internal pressure |
| 6th |  | Derivations under wire wound Cylinders |
|  | Numerical related to the internal pressure & wire wound cylinders |
|  | **Chapter 4: Thick Cylinders & Spheres:** Derivation of Lame’s equations, ,  |
| 7th |  | Radial & hoop stresses and strains in thick & Compound Cylinders |
|  | Radial & hoop stresses and strains in Spherical Shells |
|  | Radial & hoop stresses and strains in thick & Compound Cylinders, Spherical shells subjected to internal fluid pressure only |
| 8th |  | Hub shrunk on solid shaft |
|  | Numerical  **Tutorial Sheet 2** |
|  | **Chapter 5 : Rotating Rims & Discs:** Stresses in uniform rotating rings & discs |
| 9th |  | Rotating discs of uniform strength |
|  | Stresses in (I) rotating rims, neglecting the effect of spokes |
|  | Stresses in (ii) rotating cylinders |
| 10th |  | Stresses in hollow cylinders & solids cylinders. |
|  | Numerical |
|  | **Chapter 6: Springs:** Stresses in closed coiled helical springs |
| 11th |  | Stresses in open coiled helical spring subjected to axial loads  |
|  | Stresses in open coiled helical spring subjected to twisting couples |
|  | Leaf springs, flat spiral springs  |
| 12th |  | Concentric springs & Numericals **Tutorial Sheet 3** |
|  | **Chapter 7: Bending of Curved Bars :** Stresses in bars of initial large radius of curvature |
|  | Bars of initial small radius of curvature, Stresses in crane hooks |
| 13th |  | 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 |
| 14th |  | Problems & Numericals |
|  | **Chapter 8 : Unsymmetrical Bending:** Introduction to unsymmetrical bending,  |
|  | Stresses due to unsymmetrical bending |
| 15th |  | Deflection of beam due to unsymmetrical bending |
|  | Shear center for angle, channel, and I-sections |
|  |  Numericals |