**USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY**

*Department of Mechanical Engineering*

**LESSON PLAN::C0301**

|  |  |
| --- | --- |
| **Academic Year** : 2016-17 | **Sem**  : I |
| **Course**: MECHANICS OF SOLIDS | |
| **Class** : II B.TECH | **Section** : ME A&B |
| **Date of commencement of Class work** :13/06/2016 | **Date of end of Class work** : 08/10/2016 |
| **Prepared By**: N. Siva Krishna , Assistant Professor | **Approved By**: HOD |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lecture**  **No** | **Date (As per Academic calendar)** | **Topics to be covered** | **Actual**  **Dateof completion** | **Remarks** |
| 1 | **13.6.16** | Introduction to MOS Unit 1: Simple |  |  |
| 2 | **14.6.16** | **Properties of materials** |  |  |
| 3 | **15.6.16** | Stresses and strains |  |  |
| 4 | **16.6.16** | Hook’s law |  |  |
| 5 | **17.6.16** | Stress strain diagram |  |  |
| 6 | **18.6.16** | Elastic moduli |  |  |
| 7 | **20.6.16** | Bars of varying sections and composite sections |  |  |
| 8 | **21.6.16** | Bars of varying sections and composite sections |  |  |
| 9 | **22.6.16** | Temperature stresses |  |  |
| 10 | **23.6.16** | Temperature stresses |  |  |
| 11 | **24.6.16** | Complex stresses |  |  |
| 12 | **25.6.16** | Complex stresses |  |  |
| 13 | **27.6.16** | Stresses on an inclined plane under different uniaxialstress conditions |  |  |
| 14 | **28.6.16** | Stresses on an inclined plane under differentbiaxial stress conditions |  |  |
| 15 | **29.6.16** | Principal planes and principal stresses |  |  |
| 16 | **30.6.16** | Principal planes and principal stresses |  |  |
| 17 | **01.7.16** | Mohr’s circle |  |  |
| 18 | **02.7.16** | Mohr’s circle |  |  |
| 19 | **04.07.16** | Strain energy – Resilience – Gradual, suddStrain energy – Resilience – Gradualimpact and shock loadings. |  |  |
| 20 | **05.7.16** | problems |  |  |
| 21 | **07.7.16** | problems |  |  |
| 22 | **08.7.16** | assignment |  |  |
| 23 | **09.7.16** | Unit II **SHEAR FORCE AND BENDING MOMENT** |  |  |
| 24 | **11.7.16** | Definition of beam –Types of beams |  |  |
| 25 | **12.7.16** | Concept of shear force and bending moment |  |  |
| 26 | **13.7.16** | S.F and B.M diagrams for cantilever beams |  |  |
| 27 | **14.7.16** | S.F and B.M diagrams for cantilever beams |  |  |
| 28 | **15.7.16** | S.F and B.M diagrams for simply supported beams |  |  |
| 29 | **16.7.16** | S.F and B.M diagrams for simply supported beams |  |  |
| 30 | **18.7.16** | S.F and B.M diagrams for overhanging beams |  |  |
| 31 | **19.7.16** | S.F and B.M diagrams for overhanging beams |  |  |
| 32 | **20.7.16** | problems |  |  |
| 33 | **21.7.16** | problems |  |  |
| 34 | **22.7.16** | assignment |  |  |
| 35 | **23.7.16** | Unit III **FLEXURAL STRESSES** |  |  |
| 36 | **25.7.16** | Theory of simple bending – Assumptions |  |  |
| 37 | **26.7.16** | Derivation of bending equation: M/ I = f/y = E/R Neutral axis |  |  |
| 38 | **27.7.16** | Determination bending stresses for I-sec |  |  |
| 39 | **28.7.16** | Determination bending stresses for I-sec |  |  |
| 40 | **29.7.16** | Determination bending stresses for T-sec |  |  |
| 41 | **30.7.16** | section modulus of rectangular and circular sections |  |  |
| 42 | **01.8.16** | **SHEAR STRESSES**Derivation of formula |  |  |
| 43 | **02.8.16** | Shear stress distributionacross I-sec |  |  |
| 44 | **03.8.16** | Shear stress distributionacross T-sec |  |  |
| 45 | **04.08.16** | assignment |  |  |
| 46 | **05.08.16** | revison |  |  |
| 47 | **06.8.16** | revison |  |  |
|  | **08.8.16 To13.8.16** | MID EXAMINATIONS-I |  |  |
| 48 | **16.8.16** | **DEFLECTION OF BEAMS:** Bending into a circular arc – slope, deflectionand radius of curvature |  |  |
| 49 | **17.8.16** | Determination of slope and deflection for cantilever- Double integration method |  |  |
| 50 | **18.8.16** | Determination of slope and deflection for cantilever- Double integration method |  |  |
| 51 | **19.8.16** | Determination of slope and deflection for Simply supported beam- Double integration method |  |  |
| 52 | **20.8.16** | Determination of slope and deflection for Simply supported beam- Double integration method |  |  |
| 53 | **22.8.16** | Determination of slope and deflection for Simply supported beam- Macaulays method |  |  |
| 54 | **23.08.16** | Determination of slope and deflection for Simply supported beam and cantilever – Moment area method |  |  |
| 55 | **24.08.16** | Determination of slope and deflection for Simply supported beam and cantilever – Moment area method |  |  |
| 57 | **26.8.16** | problems |  |  |
| 58 | **27.8.16** | problems |  |  |
| 59 | **29.8.16** | assignment |  |  |
| 60 | **30.08.16** | Unit-V **THIN CYLINDERS** |  |  |
| 61 | **31.08.16** | Thin seamless cylindrical shells |  |  |
| 62 | **1.9.16** | Derivation offormula for longitudinal and circumferential stresses |  |  |
| 63 | **2.9.16** | Problems |  |  |
| 64 | **3.9.16** | Problems |  |  |
| 65 | **06.09.16** | hoop, longitudinal and Volumetric strains |  |  |
| 66 | **07.9.16** | hoop, longitudinal and Volumetric strains |  |  |
| 67 | **8.9.16** | changes in dia, and volume of thin cylinders |  |  |
| 68 | **09.9.16** | Problems- changes in dia, and volume of thin cylinders |  |  |
| 69 | **10.9.16** | Thin spherical shells. |  |  |
| 70 | **13.9.16** | Riveted boiler shells |  |  |
| 71 | **14.9.16** | **THICK CYLINDERS** |  |  |
| 72 | **15.9.16** | lame’s equation |  |  |
| 73 | **16.9.16** | cylinders subjected to inside &outside pressures |  |  |
| 74 | **17.9.16** | Problems |  |  |
| 75 | **19.9.16** | Compound cylinders Problems |  |  |
| 76 | **20.9.16** | Compound cylinders Problems |  |  |
| 77 | **21.9.16** | assignment |  |  |
| 78 | **22.9.16** | Derivation- Torsion of Circular shafts |  |  |
| 79 | **23.9.16** | Pure Shear-Transmission of power by circular shafts, |  |  |
| 80 | **24.9.16** | Shafts in series |  |  |
| 81 | **26.9.16** | Shafts in parallel |  |  |
| 82 | **27.9.16** | **COLUMNS** |  |  |
| 83 | **28.9.16** | Buckling and Stability |  |  |
| 84 | **01.10.16** | Columns with Pinned ends |  |  |
| 85 | **03.10.16** | Columnswith other support Conditions |  |  |
| 86 | **04.10.16** | Columnswith other support Conditions |  |  |
| 87 | **05.10.16** | Limitations of Euler’s Formula |  |  |
| 88 | **06.10.16** | Rankine’s Formula |  |  |
| 89 | **07.10.16** | revision |  |  |
| 90 | **08.10.16** | revision |  |  |
| 91 | **10.10.16 To 15.10.16** | Mid Exams-II |  |  |

**TEXT BOOKS:**

1.Strength of materials by Bhavikatti, Lakshmi publications.

2.Solid Mechanics, by Popov.

3. Mechanics of Materials by - Ferdinand P Beer, E Russell Johnston, and John T Dewolf.

**REFERENCES:**

1. Strength of Materials -By Jindal, Umesh Publications.
2. Analysis of structures by Vazirani and Ratwani.
3. Mechanics of Structures Vol-III, by S.B.Junnarkar.
4. Strength of Materials by S.Timshenko.

5. Strength of Materials by Andrew Pytel and Ferdinond L. Singer Longman

**List the Course Outcomes (Cos):**

|  |  |  |  |
| --- | --- | --- | --- |
| Sub code | Sub Name | COs | Expected level of attainment  On 5 scale |
|  | **MECHANICS OF SOLIDS** | 1. Understand the basic terms like stress, strain, poissons ratio…etc and different stresses induced in beams, thin cylinders, thick cylinders, columns.  2. Student will know the construction ofshear force diagrams and bending moment diagrams to the different loads for the different support arrangements and also problem solving techniques.  3. student will know how to finding slopeand deflection for different support arrangements by Double integration method, Macaulay’s method and Moment-Area and also problem solving techniques.  4. Student will know how a cylinder fails,what kind of stresses induced in cylinders subjected to internal, external pressures and also problem solving techniques. | 3.5  3.5  3.5  3.5 |

**Signature of faculty Head of the Department**