| Academic Lesson Plan for Strength of Material (Winter-2023) | | |
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| **Discipline: Mechanical Engineering** | **Semester: 3rd** | **Name of Faculty: Subhasini Muduli** |
| **Subject: Strength of Materials** | **No. of days/per week Class Allotted: 4** | **Semester from: 01/08/2023 - 30/11/2023** |
| | | **No. of weeks:15** |
| **Week** | **Class Day** | **Theory Topics** |
| 1st | 1st | **1) -** SIMPLE STRESS AND STRAIN - INTRODUCTION.,Types of load , Define stress and strain,Stress and Strain diagram for ductile and brittle material |
| | 2nd | Types of stress and strain , Hooke's law,Define young's modulus , modulus of rigidity , Bulkmodulus ,Define poission's ratio and derieve relation between young's modulus,modulus of rigidity,bulk modulus and poission's ratio |
| | 3rd | Derive the relation between three elastic constant |
| | 4th | principle of super position ,stress in composite section |
| 2nd | 1st | problems related superposition,Trremperature stress and derieve the deformation and strain due to it |
| | 2nd | Determine the temperature stress in composite bar |
| | 3rd | Define strain energy and Resiliance and Establish the formulae associated with it, |
| | 4th | Define strain energy and Resiliance and Establish the formulae associated with it, |
| | 1st | Determine stress due to gradually applied load , suddenly applied load and impact load |
| | 2nd | Determine stress due to gradually applied load , suddenly applied load and impact load |

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| 3rd | 3rd | 2) THIN CYLINDER AND SPHERICAL SHELL UNDER INTERNAL PRESSURE - Definition of hoop and longitudinal stress, strain |
| | 4th | Derieve Hoop stress and Longitudinal stress for thin cylinder |
| 4th | 1st | Derieve Hoop strain, Longitudinal strain and Volumetric strain |
| | 2nd | Numericals on thin cylinder and spherical shell under internal pressure |
| | 3rd | Computation of change in length , diameter and volume for thin cylinder |
| | 4th | Computation of change in length , diameter and volume for thin cylinder |
| 5th | 1st | Numericals on thin cylinder and spherical shell under internal pressure |
| | 2nd | Numericals on thin cylinder and spherical shell under internal pressure |
| | 3rd | 3) Two dimensional stress systems-Determination of normal stress, shear stress and resultant stress on oblique plane |
| | 4th | Location of principal plane |
| 6th | 1st | Location of principal plane |
| | 2nd | computation of principal stress |
| | 3rd | Location of principal plane and computation of principal stress |
| | 4th | Location of principal plane and computation of principal stress |
| 7th | 1st | computation of principal stress and Maximum shear stress using Mohr’s circle |
| | 2nd | computation of principal stress and Maximum shear stress using Mohr’s circle |
| | 3rd | Maximum shear stress using Mohr’s circle |

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| | 4th | Maximum shear stress using Mohr's circle |
| 8th | 1st | 4) Bending moment& shear force<br>-Types of beam and load |
| | 2nd | bending moment |
| | 3rd | bending moment |
| | 4th | Shear Force and Bending moment diagram and its salient features<br>illustration in cantilever beam, |
| 9th | 1st | simply supported beam |
| | 2nd | simply supported beam |
| | 3rd | over hanging beam under point load and uniformly distributed load |
| | 4th | over hanging beam under point load and uniformly distributed load |
| 10th | 1st | over hanging beam under point load and uniformly distributed load |
| | 2nd | over hanging beam under point load and uniformly distributed load |
| | 3rd | 5) Theory of simple bending |
| | 4th | Theory of simple bending |
| 11th | 1st | Bending equation |
| | 2nd | Moment of resistance |
| | 3rd | section modulus |
| | 4th | section modulus |
| | 1st | neutral axis. |

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| 12th | 2nd | simple problems. |
| | 3rd | simple problems. |
| | 4th | simple problems. |
| 13th | 1st | 6) Combined direct & bending stresses- Define column |
| | 2nd | Axial load, Eccentric load on column, |
| | 3rd | Direct stresses, Bending stresses, Maximum& Minimum stresses.<br>Numerical problems on above. |
| | 4th | Buckling load computation using Euler's formula (no derivation) in<br>Columns with various end conditions |
| 14th | 1st | Buckling load computation using Euler's formula (no derivation) inColumns with various end conditions |
| | 2nd | Buckling load computation using Euler's formula (no derivation) inColumns with various end conditions |
| | 3rd | 7) Torsion -. Assumption of pure torsion |
| | 4th | The torsion equation for solid shaft |
| 15th | 1st | The torsion equation hollow circular shaft |
| | 2nd | Comparison between solid and hollow shaft subjected to pure torsion |
| | 3rd | Comparison between solid and hollow shaft subjected to pure torsion |
| | 4th | Revision |

Subhasini Muduli

| Academic Lesson Plan for Design of Machine Element (Winter-2023) | | |
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| **Discipline: Mechanical Engineering** | **Semester: 5th** | **Name of Faculty: Subhasini Muduli** |
| **Subject: Design of Machine Element.** | **No. of days/per week Class Allotted: 4** | **Semester from: 01/08/2023 - 30/11/2023** |
| | | **No. of weeks:15** |
| **Week** | **Class Day** | **Theory Topics** |
| 1st | 1st | **UNIT-1.0** Introduction: Introduction to Machine Design and Classify it. |
| | 2nd | Different mechanical engineering materials used in design with their uses and their mechanical and physical properties. |
| | 3rd | Different mechanical engineering materials used in design with their uses and their mechanical and physical properties. |
| | 4th | Define working stress, yield stress, ultimate stress & factor of safety and stress –strain curve for M.S & C.I. |
| 2nd | 1st | Ultimate stress & factor of safety |
| | 2nd | Stress –strain curve for M.S & C.I. |
| | 3rd | Modes of Failure (By elastic deflection |
| | 4th | General yielding & fracture) |
| 3rd | 1st | State the factors governing the design of machine elements. |
| | 2nd | State the factors governing the design of machine elements. |
| | 3rd | Describe design procedure. |
| | 4th | Describe design procedure. |
| | 1st | **UNIT-2.0** Design of fastening elements: Joints and their classification. |

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| 4th | 2nd | State types of welded joints |
| | 3rd | State advantages of welded joints over other joints. |
| | 4th | Design of welded joints for eccentric loads. |
| 5th | 1st | State types of riveted joints and types of rivets. |
| | 2nd | Describe failure of riveted joint |
| | 3rd | Determine strength & efficiency of riveted joints |
| | 4th | Design riveted joints for pressure vessel. |
| 6th | 1st | Solve numerical on Welded Joint and Riveted Joints. |
| | 2nd | Solve numerical on Welded Joint and Riveted Joints. |
| | 3rd | Solve numerical on Welded Joint and Riveted Joints. |
| | 4th | Solve numerical on Welded Joint and Riveted Joints. |
| 7th | 1st | **UNIT-3.0** Design of shafts and Keys:State function of shafts. |
| | 2nd | State materials for shafts. |
| | 3rd | Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity |
| | 4th | Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity |
| | 1st | State standard size of shaft as per I.S. |

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| 8th | 2nd | State function of keys, types of keys & material of keys. |
| | 3rd | Describe failure of key, effect of key way. |
| | 4th | Design rectangular sunk key considering its failure against shear & crushing. |
| 9th | 1st | Design rectangular sunk key by using empirical relation for given diameter of shaft. |
| | 2nd | State specification of parallel key, gib-head key, taper key as per I.S. |
| | 3rd | Solve numerical on Design of Shaft and keys |
| | 4th | Solve numerical on Design of Shaft and keys |
| 10th | 1st | **UNIT-4.0** Design of Coupling;- Design of Shaft Coupling |
| | 2nd | Requirements of a good shaft coupling |
| | 3rd | Types of Coupling. |
| | 4th | Design of Sleeve or Muff-Coupling |
| 11th | 1st | Design of Sleeve or Muff-Coupling |
| | 2nd | Design of Clamp or Compression Coupling |
| | 3rd | Design of Clamp or Compression Coupling |
| | 4th | Solve simple numerical on above |
| 12th | 1st | Solve simple numerical on above |
| | 2nd | Solve simple numerical on above |
| | 3rd | Solve simple numerical on above |
| | 4th | Solve simple numerical on above |

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| 13th | 1st | **UNIT-5.0** Design a closed coil helical spring:- Materials used for helical spring |
| | 2nd | Materials used for helical spring |
| | 3rd | Standard size spring wire. (SWG). |
| | 4th | Terms used in compression spring. |
| 14th | 1st | Stress in helical spring of a circular wire |
| | 2nd | Stress in helical spring of a circular wire |
| | 3rd | Deflection of helical spring of circular wire. |
| | 4th | Deflection of helical spring of circular wire. |
| 15th | 1st | Surge in spring |
| | 2nd | Solve numerical on design of closed coil helical compression spring |
| | 3rd | Numerical solving |
| | 4th | Numerical solving |

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