

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT
Department of civil Engineering

Academic Year: **2016-17**Semester: **EVEN**

COURSE PLAN

Semester: **IV**Subject Code& Name: **15CV42 & ANALYSIS OF DETERMINATE STRUCTURES**Name of Subject Teacher: **JEEVA JOTHLG**Name of Subject Expert (Reviewer): **KALYANI**For the Period: From: **1-02-17 to 19-05-17**

Details of Book to be referred:

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| Text Books | <p>TB 1: Reddy C S, Basic Structural Analysis, Tata McGraw Hill, New Delhi.</p> <p>TB 2: Muthu K U. etal, Basic Structural Analysis, 2ND edition, IK International Pvt. Ltd., New Delhi, 2015.</p> <p>TB 3: Bhavikatti, Structural Analysis, Vikas Publishing House Pvt. Ltd, New Delhi, 2002.</p> |
| Reference Books | <p>RB 1: Hibbeler R C, Structural Analysis, Prentice Hall, 9 edition, 2014</p> <p>RB 2: Prakash Rao D S, Structural Analysis, University Press Pvt. Ltd, 2007</p> |

| Lecture NO | Topic Planned | Practical Applications & Brief objectives | Book referred with Pg No. | Planned Date | Executed Date | Deviation Reasons thereof | How Made Good / Reciprocate arrangement | Remarks by HOD |
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| 1. | MODULE 1: Introduction to the subject | <p>Objective:</p> <p>To study the equilibrium conditions and to analyze whether a structure is statically determinate or not.</p> <p>Application:</p> <p>It can be applied in the analysis of trusses, beams and any structural member.</p> <p>OUTCOME:</p> <p>Students will be able to know the concept of analysis of trusses and equilibrium conditions</p> | | 06/02/2017 | | | | |
| 2. | Structural forms and Conditions of equilibrium | | T1: 1.1-1.4 | 06/02/2017 | | | | |
| 3. | Compatibility Conditions and Degree of freedom | | T1: 3.1-3.2 & 13.2-13.4 | 07/02/2017 | | | | |
| 4. | Linear and non linear analysis . | | T1: 3.4-3.5 | 09/02/2017 | | | | |
| 5. | Static and kinematic indeterminacies of structural systems | | T1: 3.5 | 10/02/2017 | | | | |
| 6. | Definition of truss and Types of trusses. Assumptions in analysis | | T1: 3.5-3.6 | 10/02/2017 | | | | |
| 7. | Analysis of determinate trusses by method of joints | | T1: 6.1-6.4 | 13/02/2017 | | | | |
| 8. | Problems on Analysis of determinate trusses by method of joints | | T1: 6.5-6.14 | 13/02/2017 | | | | |
| 9. | Problems on Analysis of determinate trusses by method of joints | | T1: 7.1-8.7 | 14/02/2017 | | | | |

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| 10. | Problems on Analysis of determinate trusses by method of joints | | T1: 9.1-9.7 | 16/02/2017 | | | | |
| 11. | Analysis of determinate trusses by method of joints. | | T1: 10.1-10.3 | 17/02/2017 | | | | |
| 12. | Problems on Analysis of Determinate trusses by method of sections. | | T1: 11.1-11.2 | 17/02/2017 | | | | |
| 13. | Problems on Analysis of Determinate trusses by method of sections. | | T1: 11.3-11.4 | 20/02/2017 | | | | |
| 14. | Problems on Analysis of Determinate trusses by method of sections. | | T1: 22.4 | 21/02/2017 | | | | |
| 15. | Problems on Analysis of Determinate trusses by method of sections. | | T1: 5.1-5.3 | 23/02/2017 | | | | |
| 16. | MODULE 2: Definition of slope, Deflection and curvature, Sign conventions, | Objective: To understand the concept of slope and deflection. To analyze the beam with different loading cases. To analyze structural systems and interpret data. | T1: 15.1 | 27/02/2017 | | | | |
| 17. | Derivation of moment-curvature equation. | | T1: 15.5 | 27/02/2017 | | | | |
| 18. | Double integration method and Macaulay's method: Slope and deflection for standard loading cases. | | T1: 15.3-15.4 | 28/02/2017 | | | | |
| 19. | Slope and deflection for determinate prismatic beams subjected to point load. | | T1: 15.3-15.4 | 02/03/2017 | | | | |

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| 20. | Slope and deflection for determinate prismatic beams subjected to point UDL. | <p>To Apply knowledge of mathematics and engineering in calculating slope and deflections</p> <p>Application:</p> <p>Evaluate the deflection of cantilever, simply supported and overhanging beams by different Methods.</p> <p>OUTCOME:</p> <p>Students will be able to analyze any type of determinate structures after the completion of this unit</p> | T1: 15.6-15.8 | 03/03/2017 | | | | |
| 21. | Slope and deflection for standard loading cases for UVL and couple. | | T1: 15.2 | 03/03/2017 | | | | |
| 22. | Moment area method: Derivation of MAM. | | T1: 15.5 | 06/03/2017 | | | | |
| 23. | Mohr's theorems. | | T3:Pg 374-395 | 06/03/2017 | | | | |
| 24. | Sign conventions, Application of moment area method for determinate prismatic beams. | | T3:Pg 129-149 | 07/03/2017 | | | | |
| 25. | Sign conventions and Application of moment area method for determinate Beams of varying section | | T3:Pg 109-119 | 13/03/2017 | | | | |
| 26. | Use of moment diagram by parts. | | T3:Pg 164-173 | 13/03/2017 | | | | |
| 27. | Conjugate beam method: Real beam and conjugate beam. | | T3:Pg 170-172 | 14/03/2017 | | | | |
| 28. | Conjugate beam theorems | | T3:Pg 166-168 | 16/03/2017 | | | | |
| 29. | Application of conjugate beam method of determinate beams of variable cross sections. | | | 17/03/2017 | | | | |
| 30. | MODULE 3: Energy Principles and Energy Theorems | Objective: To study about virtual work and virtual forces. | T3: Pg 213-217 & 257-260 | 20/03/2017 | | | | |

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| | Principle of virtual displacements and Principle of virtual forces. | To study the Stress and strain behavior of the structures due to axial forces. | | | | | | |
| 31. | Strain energy and complimentary energy. | To study about the deflection of beams. | T3: Pg 229-217 | 20/03/2017 | | | | |
| 32. | Strain energy due to axial force, bending, shear and torsion. | Application: Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames. | T3: Pg 229-217 | 21/03/2017 | | | | |
| 33. | Deflection of determinate beams and trusses using total strain energy. | | T3: Pg 321-333 | 23/03/2017 | | | | |
| 34. | Deflection of determinate beams and trusses using total strain energy. | OUTCOME: Students will be able to estimate the bent frames and thorough with the concepts of stress, strain and shear. | T3: Pg 268-275 | 24/03/2017 | | | | |
| 35. | Deflection at the point of application of single load. | Deflection of trusses is analyzed well in advance which reduces the probability of collapse in trusses. | T2: Pg 282-285 & 364-377 | 27/03/2017 | | | | |
| 36. | Deflection at the point of application of single load and numerical based on it. | | T4: Pg 385-396 | 27/03/2017 | | | | |
| 37. | Castigliano's theorems and its application to estimate the deflections of trusses | | T1: Pg 324-325 & 329-334 | 28/03/2017 | | | | |
| 38. | Castigliano's theorems and its application to estimate the deflections of trusses | | T2: Pg 334-337 | 30/03/2017 | | | | |
| 39. | To estimate bent frames and Special applications of Dummy unit load method. | | T3: Pg 4-14 | 31/03/2017 | | | | |

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| 40. | MODULE 4: Arches and Cable Structures Three hinged parabolic arches with supports at the same levels. | <p>Objective:</p> <p>To determine the thrust and shear of parabolic arch. To determine the bending of cables under various loading conditions.</p> <p>Application:</p> <p>Analysis of arches and cables which is determinate under any load condition can be made using any of method taught in this unit.</p> <p>OUTCOME:</p> <p>Students will be able to determine the stress resultants in arches and cables.</p> | T2: Pg 44-53 | 31/03/2017 | | | | |
| 41. | Three hinged parabolic arches with supports at the different levels. | | T1: Pg 33-44 | 03/04/2017 | | | | |
| 42. | Determination of normal thrust. | | T1: Pg 60-102 | 03/04/2017 | | | | |
| 43. | Determination of normal thrust. | | T1: Pg 62 | 04/04/2017 | | | | |
| 44. | Determination of radial shear | | T1: Pg 65 | 06/04/2017 | | | | |
| 45. | Determination of radial shear | | T1: Pg 66 | 07/04/2017 | | | | |
| 46. | Determination of bending moment. | | T2: Pg 152-164 | 07/04/2017 | | | | |
| 47. | Determination of bending moment. | | T2: Pg 114-119 | 10/04/2017 | | | | |
| 48. | Analysis of cables under point loads. | | T2: Pg 132-133 | 10/04/2017 | | | | |
| 49. | Analysis of cables under UDL. | | T4: Pg 180-182 | 11/04/2017 | | | | |
| 50. | Analysis of cables under UDL. | | T2: Pg 176-180 | 13/04/2017 | | | | |
| 51. | Length of cables for supports at same level. | | T1: 16.1-16.4 & 16.6 | 20/04/2017 | | | | |
| 52. | Length of cables for supports at different level. | | T1: 16.7-16.8 | 21/04/2017 | | | | |

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| 53. | Stiffening trusses for suspension cables. | | T1: 16.5-16.6 | 21/04/2017 | | | | |
| 54. | MODULE 5: Influence Lines and Moving Loads Concepts of influence lines | <p>Objective:</p> <p>To Understand the concept of influence lines and construct the ILD diagram for the moving loads.</p> <p>Application:</p> <p>Arches and cables help to connect two land masses.</p> <p>OUTCOME:</p> <p>Students will be able to know the difference between determinate and indeterminate structures. And also the concepts of shear force and bending moment.</p> | T1: 17.1-17.3 | 24/04/2017 | | | | |
| 55. | ILD for reactions. | | T1: 18.8 & 20.1-20.13 | 24/04/2017 | | | | |
| 56. | SF and BM for determinate beams | | T1: 19.1-19.16 | 25/04/2017 | | | | |
| 57. | SF and BM for determinate beams | | T1: 18.9&24.1 | 27/04/2017 | | | | |
| 58. | SF and BM for determinate beams | | T3: Pg 173-186 | 28/04/2017 | | | | |
| 59. | ILD for axial forces in determinate trusses Reactions. | | T3: Pg 187-193 & | 02/05/2017 | | | | |
| 60. | ILD for axial forces in determinate trusses Reactions. | | T3: Pg 231-237& 238-242 | 04/05/2017 | | | | |
| 61. | BM in determinate beams using rolling loads concepts. | | T3: Pg 237-238&242-244 | 05/05/2017 | | | | |
| 62. | BM in determinate beams using rolling loads concepts. | | T3: Pg 406-414 | 08/05/2017 | | | | |
| 63. | SF in determinate beams using rolling loads concepts. Numerical based on it. | | T3: Pg 414-422 & 432-437 | 09/05/2017 | | | | |
| 64. | Numerical | | | 11/05/2017 | | | | |

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| 65. | SF in determinate beams using rolling loads concepts. | | T3: Pg 414-422 | 12/05/2017 | | | | |
| 66. | Numerical | | | 12/05/2017 | | | | |
| 67. | Revision 1 | Solving VTU Question Paper | | 15/05/2017 | | | | |
| 68. | Revision 2 | | | 18/05/2017 | | | | |
| 69. | Revision 3 | | | 19/05/2017 | | | | |

Prepared By: _____
(Faculty)
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Reviewed by: _____
(Sub. expert)
Date & Sign _____

Approved by: _____
(HOD)
Date & Sign _____

Approved by: _____
(Principal/ Acad. Co)
Date & Sign _____