

4/4 B.Tech. SEVENTH SEMESTER

CE7T1

ADVANCED STRUCTURAL ENGINEERING

Credits: 3

Lecture: 3 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Pre-requisites: Design and drawing of concrete structures I & II

Learning objectives:

- To be able to apply the moment distribution and strain energy methods.
- To draw the Influence Line Diagrams (ILDs) and to solve the 2 and 3 hinged arches.
- To analyze the beams, frames and trusses by using flexibility and stiffness methods.
- To use the concept of plastic theory and to do the plastic analysis for economical design.

Course outcomes:

At the end of course, the student will be able to:À

1. Estimate the functional requirements such as topographical, geotechnical and navigational details, design the flood discharge
2. Design the Deck slab bridge
3. Design the T beam bridges for IRC loading by using Pigud's and Courbon's theories.
4. Design and detailing of RCC water tanks
5. Determine loads acting on tower and designing a simple tower

UNIT – I

BRIDGE ENGINEERING

Introduction - Classification of bridges - Functioning of structural elements in bridges - Investigation for major bridges, Navigational requirements, Construction resources, Traffic forecast – Design of flood discharge – Linear waterway of bridges – Loading standards. Introduction to Deck slab Bridges – Economic span length – IRC Loading and codal provisions – Design and detailing of deck slab bridges for IRC loading.

UNIT – II

T –BEAM BRIDGES

Introduction – Wheel load analysis – BM in the slab – Pigud's theory – Analysis of longitudinal girders by Courbone's theory, Design and detailing of R.C T-beam bridges for IRC loading.

UNIT-III

OVER HEAD RCC TANKS

Introduction – Design and detailing of overhead circular and intze RCC tanks including staging.

UNIT – IV

GANTRY GIRDER

Impact factors, longitudinal forces - Design of a gantry girder

UNIT – V

TOWERS

Introduction – Basic structural configurations – Loads on towers – Wind load – Design of a Communication tower.

Learning resources:

Text books:

1. Ponuswamy, S. Bridge Engineering, (2nd edition), Tata McGraw-Hill, 2007.
2. Varghees - Advanced Reinforced concrete structures, (2nd edition), Prentice Hall of India Pvt. Ltd., 2005.
3. Duggal S.K. - Design of steel structures, Tata Mc-Graw Hill Publications, 3rd edition, New Delhi

4. Bhavikatti S.S. – Design of steel structures – IK International publishing house Pvt. Ltd.

Reference books:

1. John Victor, D. Essentials of Bridge Engineering, Oxford & IBH, 2001
2. Krishna Raju, N. Design drawing of concrete and steel structures, University Press, 2005.
3. Subramanian, N. – Steel structures design and practice, Oxford University Press,
4. Salmon, C.G. and Johnson, J.E. Steel structures- Design and behavior, Prentice-Hall,1997

e-learning resources:

<http://nptel.ac.in/courses.php>

<http://jntuk-coerd.in/>