DESIGN OF FORMWORK
(Job Oriented Elective – II)

Course Code: 20CE11Q4

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Pre-requisites: Structural Analysis

Course Outcomes:

At the end of the Course, the Student will be able to:

CO1: Explain the various materials required for formwork (L2)
CO2: Analyse the loads on formwork (L4)
CO3: Design the formwork systems (L4)
CO4: Discuss the applications of special forms and their safety (L2)
CO5: Analyse the tie system in scaffolding (L4)

UNIT-I **(10 Lectures)**

INTRODUCTION:

Formwork, scaffolding systems, types of formwork, Construction planning and site constraints, Materials and construction of the common formwork and false work systems, Planning for maximum reuse – Economical form construction, Special and proprietary forms.

Learning outcomes:

At the end of the unit, the student will be able to

1. Explain the types of formwork (L2)
2. Describe the materials requires for the formwork (L2)
3. Identify the economy aspects of formwork (L2)

UNIT-II **(10 Lectures)**

LOADS AND PRESSURES:

Pressures on Formwork - Concrete density – Height of discharge – Temperature – Rates of Placing – Consistency of concrete – Live loads and wind pressure – Vibration, Hydrostatic Adjustment for non-standard condition.

Learning outcomes:

At the end of the unit, the student will be able to

1. Identify the factors affecting the concrete pressure (L2)
2. Analyze the loads acting on the formwork (L4)
3. Evaluate the pressure on formwork (L3)

UNIT-III **(10 Lectures)**

SHORING, FORMWORK AND ACCESSORIES DESIGN:

Simple wood stresses – Slenderness ratio – Allowable loads – Tubular steel shores - Patented shores – Site Preparation - Size and spacing – Steel Tower Frames – Safety practices – Horizontal shoring for multi-levels – More concentrated shore loads. Basic simplification – Beam formulae – Allowable stresses – Deflection bending lateral stability – Shear, Bearing – Examples of wall forms – Slab forms – Beam form – Ties, Anchors and Hangers – Column forms – Examples of each.

Learning outcomes:

At the end of the unit, the student will be able to

1. Analyze the design aspects of shores (L4)
2. Discuss the design parameters of beam formwork (L2)

3. Describe the design aspects of components of column formwork (L2)

UNIT-IV **(10 Lectures)**

SPECIAL FORMS AND FORMWORK SAFETY:

The use and applications of special forms - slip form, tunnel form, climbing form, flying form, Sequence of construction, stripping of formwork, Safe use of formwork.

Learning outcomes:
At the end of the unit, the student will be able to
1. Describe the applications of special forms (L2)
2. Explain the working principle of special form (L2)
3. Illustrate the method of stripping of formwork (L2)

UNIT-V **(10 Lectures)**

SCAFFOLDING:

Types of scaffolds - Putlog and Independent scaffold – Single pole scaffolds – Fixing ties – Spacing of ties - Plan Bracing – Knots – Safety nets – General safety requirements – Precautions – Truss, Suspended – Gantry and system scaffolds.

Learning outcomes:
At the end of the unit, the student will be able to
1. Discuss the types of scaffolds (L2)
2. Analyze the tie system in scaffold (L4)
3. Demonstrate the safety aspects in scaffold (L3)

Text Books:

1. Hurd, M.K., Formwork for Concrete, 7th Edition, American Concrete Institute, 2005.
2. Robert L. Peurifoy and Garold D. Oberlender, Formwork for Concrete., Structures, 4th Edition, McGraw Hill Professional, 2010.

References: