

**CONSTRUCTION METHODS AND EQUIPMENT**  
**(Professional Elective-II)**

**Course Code: 20CE1155**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Pre-requisites:** Building Materials and Concrete Technology

**Course Outcomes:** At the end of the course, the student will be able to:

**CO1:** Describe the construction methods of substructures and superstructures (L2)

**CO2:** Explain the techniques for the erection of construction units (L2)

**CO3:** Demonstrate about construction equipment and machinery (L2)

**CO4:** Discuss about hauling and conveying equipment (L2)

**CO5:** Explain the process of managing construction equipment (L2)

**UNIT- I**

**(10 Lectures)**

**SUB-STRUCTURE:**

Methods of Excavation in shallow and deep foundations include submerged soil conditions, arrangement shoring, safety measures, Drilling and blasting techniques of foundation and tunnels

**SUPER-STRUCTURE:**

Mechanized methods of concrete works for cast-in-situ and precast constructions, Measures of concrete transportation and pouring, Construction of forms, scaffolding and safety measures

**Learning outcomes:**

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

1. Explain various methods of excavation techniques in shallow and deep foundations (L2)
2. Describe the process of drilling and blasting techniques for excavations of foundations (L2)
3. Discuss the mechanized methods of concreting for cast-in-situ and precast concrete constructions (L2)

**UNIT- II**

**(10 Lectures)**

**ERECTION OF CONSTRUCTION UNITS:**

Prefabricated construction Techniques, Modular construction system, I.S. code recommendations, planning, standardization, mass production and transportation of precast elements, construction provisions and assembly of elements, Erection of precast elements, jointing and testing.

**Learning outcomes:**

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

1. Describe various types of prefabricated construction techniques (L2)
2. Explain various construction provisions in the design of prefabricated elements (L2)
3. Explain the procedure for erection and assembly of precast members in buildings (L2)

### **UNIT- III**

**(10 Lectures)**

#### **EARTH MOVING EQUIPMENT AND MACHINERY:**

Power shovels, Back hoe, Loader, Dragline, Clamshell, and Tunneling machine.

Earth excavation equipment: Back hoe, Scraper, Bulldozer.

Earth compacting equipment: Smooth wheel and Sheep-foot roller, Vibro compacting roller, Pneumatic type rollers, compacting and paving technology.

#### **Learning outcomes:**

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

1. Explain various types of earth moving equipment used in construction (L2)
2. Discuss about various earth compacting equipments used in stabilization of soil (L2)
3. Describe the suitability of various earth excavation equipment used in constructions (L2)

### **UNIT- IV**

**(10 Lectures)**

#### **CONSTRUCTION EQUIPMENT:**

Hoisting equipment:—such as hoist winch, hoisting chains, hooks and slings, various types of cranes —tower crane, mobile crane and derrick crane, performance and safety in operation.

Conveyors: Belt Conveyors, Screw conveyor, Bucket conveyor.

Production equipment: Concrete mixers, truck mixers, pneumatic concrete placer, concrete vibrators.

#### **Learning outcomes:**

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

1. Explain various types of hoist and hauling equipment used for conveyance of construction Material (L2)
2. Describe the role of various equipment used for mass production of concrete (L2)
3. Discuss the role of machinery and equipment during mass production and transportation of concrete (L2)

### **UNIT- V**

**(10 Lectures)**

#### **TIME AND MOTION STUDIES:**

Process charts—necessary and application of queuing techniques or wait line models for maintenance of construction equipment

#### **MANAGEMENT OF CONSTRUCTION EQUIPMENT:**

Need for mechanization of construction – planning and financing of construction plant and equipment – Selection of owning and operating equipment versus hiring.

#### **Learning outcomes:**

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

1. Explain the application of queuing or wait line techniques for implementation of construction equipment and machinery (L2)
2. Describe the role of planning and financing of construction plant and equipment (L2)
3. Explain the merits of hiring or owning and operating equipment during various types of construction methods (L2)

**Text Books:**

1. S. Seetharaman, "Construction Engineering and Management", 4<sup>th</sup> Edition, Umesh publications, New Delhi, 1999.
2. Mahesh Varma, "Construction Equipment and its Planning and Applications", 5<sup>th</sup> Edition, Metropolitan Book Co. Publishers, 2005.

**References:**

1. Sengupta and Guha, "Construction Management and Planning", 2<sup>nd</sup> Edition, TMH, 2002.
2. Rangwala, S.C, "Construction of Structures and Management of Works", 5th Edition, Charotar publishers, 2005  
Srivatsava, U.K., "Construction Planning and Management", 1<sup>st</sup> Edition, Galgotia Publications Pvt. Ltd., New Delhi, India, 1999.
3. "Construction Machinery and Equipment in India". (A compilation of articles Published in Civil Engineering and Construction Review) Published by Civil Engineering and Construction Review, New Delhi, 1991.
4. Jay P.K. "Hand Book of Construction Management" 1<sup>st</sup> Edition, Mamillan India Ltd., New Delhi, 1990.
5. National Building Code, ISI, New Delhi, 2016.
6. Ghalot P.S. and Dhir B.M., "Construction Management", 2<sup>nd</sup> Edition, Wiley-Eastern, 1999
7. Peurifoy, R.L., "Construction Planning, Equipment and Methods", 5<sup>th</sup> Edition, Charotarpublishers , 2005
8. Srivatsava, U.K., "Construction Planning and Management", 1<sup>st</sup> Edition, Galgotia Publications Pvt. Ltd., New Delhi, India, 1999.
9. Jay P.K. "Hand Book of Construction Management" 1<sup>st</sup> Edition, Mamillan India Ltd., New Delhi, 1990.