



**JECRC Foundation**



**JAIPUR ENGINEERING COLLEGE  
AND RESEARCH CENTRE**

# **JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTER**

**Class – VI A & B**

**Subject – Construction Technology & Equipment**

**Ch – 1**

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# **VISSION AND MISSION OF INSTITUTE**

## **VISION**

**To become a renewed center of outcome based learning, and work towards academic, professional, culture and social enrichment of the lives of inviduals and communities.**

## **MISSION**

**Focus on evaluation of learning outcomes and motivate students to inculcate research Aptitude by project based learning. Identify, based on informed perception of Indian, Regional and global needs, areas of focus and provide platform to gain knowledge and solutions. Offer opportunities for interaction between academia and industry. Develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.**

# **VISSION AND MISSION OF DEPARTMENT**

## **VISION**

**To become a role model in the field of Civil Engineering for the sustainable development of the society.**

## **MISSION**

- 1)To provide outcome base education.**
- 2)To create a learning environment conducive for achieving academic excellence.**
- 3)To prepare civil engineers for the society with high ethical values**

# SYLLABUS

S NO.	CONTENT
1	<b>Introduction:</b> Objective, scope and outcome of the course.
2	<b>Engineering Economy:</b> Principle of Engineering Economy, Minimum cost point analysis, Breakeven point analysis, Depreciation and depletion
3	<b>Safety in construction:</b> Causes, classification, cost and measurement of an accident, safety programme for construction, protective equipment, accident report, safety measure: (a) For storage and handling of building materials. (b) Construction of elements of a building (c) In demolition of buildings; Safety lacuna in Indian scenario. Fire safety provisions as per NBC.
4	<b>Construction Planning:</b> Need of construction planning, Constructional Resources, construction team, stages in construction, preparation of construction schedule, Job layout, inspection and quality control; <b>Materials Management:</b> Objective and functions of material management
5	<b>Construction Equipment and Management:</b> Earth Moving Equipment-Bull dozers tractor pulled scrapers Power shovels Draglines clamshells; cranes; Hoes, Trenching machine types Hauling Equipment; Drilling, Blasting and Tunneling Equipment; Pile Driving Equipment

# COURSE OUTCOME

<b>CO 1</b>	To understand the concept of Engineering Economy, Depreciation and Depletion.
<b>CO 2</b>	To understand safety in construction.
<b>CO 3</b>	To understand need of construction planning and objective of material management.
<b>CO 4</b>	To understand the various technology and equipment involved in construction.

## INTRODUCTION, SCOPE AND OUTCOME

- Construction is one of the branches of civil engineering that is concerned directly with common people, as everyone wants to have beautiful dwellings.
- Buildings are built from long ago in history but the difference is of technology as early buildings were simple and just for the purpose of shelter.
- With the passage of time, revolutionary changes have appeared in construction also and it is all due to the technology that can be defined as practical use of your knowledge.
- In the beginning, buildings were made from stones and mud, but in recent time, we construct buildings using multiple types of materials including stone, timber, concrete, metals, glass, etc.

## TYPES OF CONSTRUCTION TECHNOLOGIES

- Construction industry includes a wide range of constructions suitable for all classes of society. Commercial construction, domestic construction, industrial construction, heavy or civil constructions are a few examples that are now displaying master pieces of construction technologies.
- Each of these requires different technological treatments. For domestic construction, simple technological methods are usually preferred and frequently available materials are mostly used. These are mostly low cost projects and are also short-term.
- In commercial construction, the basic concern is infrastructure that is responsible for strength and life of project. These are mostly launched by government agencies.
- These projects require latest construction technologies, equipment, and materials.

# ROLE OF TECHNOLOGY IN BUILDING DESIGNS

- With the passage of time, construction industry has passed through advancements. One of them is emphasis on designing buildings before practically constructing these buildings.
- Progress in technology has introduced successful techniques to develop strong and long lasting buildings.
- Development in the field of IT has become the main source for latest designing approach in construction technologies.
- Building Information Modeling (BIM) is one of such computerized systems that facilitate for collecting information about buildings under construction on regular basis.
- This system greatly enhances the communication among engineers and designers that are working on the project.
- Computer aided designing helps in designing flawless buildings as through computer simulations problems can be found and resolved before constructing buildings physically.



# INNOVATIONS IN CONSTRUCTION TECHNOLOGY

- Technological progress has introduced many innovations in field of construction industry. There is huge difference between new and old construction methods.
- Use of latest machinery has made its way through the civil engineering. Most of the building parts such as pillars, roofs, and concrete blocks are available in prepared forms that increase the speed of construction process greatly.
- Use of pre-stressed concrete tendons and beams strengthen the buildings along with speedy construction.

# GREEN CONSTRUCTION

- The green revolution has also some effects on this industry. Global movement of saving the natural environment has emerged the latest concept.
- It means while constructing buildings, natural environment should not be spoiled and materials used for building must be eco-friendly.
- This concept should be implemented to all types of construction including domestic as well as commercial construction.
- Green construction is actually an eco-friendly construction system that follows the regulations, which are created to save the environment of our planet.

## **LEED**

- The latest approach in construction technology is LEED (Leadership in Energy and Environment Design). It is also introduced to monitor the green construction level in the industry.
- It assures the quality and checks the eco-friendly mode of construction.
- It also works to search and introduce the materials for green construction. Moreover, it also pays attention to all related aspects and monitors it keenly to make all the process eco-friendly by keeping a balance in energy level of system.

## Hercules Single Strand Tensioning System

- The construction industry is re-energized by technology, particularly for building infrastructure locations such as bridges, as it requires extra strength and durability.
- For attaining this purpose, new technologies are wonderful, as they are reducing time and used men power with increased strength and robustness.
- In early system, cables were drawn manually and then concrete was poured to enhance the sturdiness by using massive labor. In spite of all this quality maintenance was big issue.
- It also increases the cost of project that sometimes goes beyond the expectations. Hercules Single Strand Stressing System provides a suitable solution for many such problems in huge projects for the strength of infrastructure.
- Use of modern technology and machinery guarantees the quality assurance of the project. Pre-stress concrete tendons with steel cables ensure the quality.
- Along with Hercules Single Strand Stressing Systems, other improvements can also be seen such as utilization of low-pressure hydraulics with jacks and chucks that dispense the tension cables swifter and devoid of the shock gaps that can form through the manual pulling.

## Styrofoam Panels

- This technology is being practiced for mainstream for the last decade. This technology provides good resistance to thermal convection that helps in creation of heat controlled homes.
- Styrofoam panels are actually EPS foam that is sealed between steel sheets for strength and this foam works as thermal resistor.
- It not only has heat resistance but also has capacity to endure the wind speed up to 140 mph. This makes it favorable in the areas targeted by hurricane.
- As it laminates the foam in steel sheets that make it safer from termites, as they can't invade steel sheets.
- The durability and strength of Styrofoam make buildings long lasting and cleaner than buildings constructed with other materials.
- Use of new technology in construction endows with comfortable buildings for housing and business.

## Unbonded PT Slabs

- Unbonded PT slabs are being used in construction industry since long and have proven them beneficial.
- These are affordable for constructing modern buildings and are also considered reliable for their quality and strength. Their steel strands are greased well to resist rusting that increase their age.
- The unbonded PT slabs are light weight and flexible due to small thickness of its unbonded tendon.
- Due to this reason, unbonded PT slab patterns are able to make best use of complete strength of a concrete slab.
- These are successfully used at different places such as on roofs, pavements, and even in the round water tanks.
- One thing must be kept in mind while purchasing them that never compromise on their quality.