

Hydropower Structures Components

Course Name	Hydropower Structures Components
Course Name as on Certificate	Hydropower Structures Components
Certificate Type	Certificate of Completion by IITM Pravartak and L&T EduTech
Certificate Issued by	IIT MADRAS and L&T EduTech
Course Overview	<p><u>Course Overview</u></p> <p>This course provides a comprehensive overview of hydropower projects, detailing the various components and systems involved. Key topics include the headworks, such as barrages and weirs, desilting chambers, different types of headworks. The course also delves into diversion and storage headworks. Major dams in India are highlighted for their structural and functional significance. Additionally, the course explores dam sections, including non-overflow and overflow sections and galleries, energy dissipators, river training works, cross drainage works, hydromechanical equipment and trash racks. The design and construction of tunnels and caverns for water conveyance and housing equipment are covered, with an emphasis on geotechnical surveys to ensure site suitability. The course includes discussions on different tunneling techniques, as well as ventilation and lighting systems crucial for safe and efficient tunnel operations. Mucking and hauling methods for removing excavated material are covered, along with safety protocols to protect workers and equipment in tunnels.</p> <p><u>Course Objectives</u></p> <ul style="list-style-type: none"> • Understand the fundamental components of hydropower projects, headworks such as barrages and weirs, desilting chamber and water conductor systems. • Describe retaining walls, river training works, cross drainage works, and tail race channels, and their significance in project stability and efficiency. • Assess the types and selection criteria of hydromechanical components, such as gates, valves, and turbines, for their roles in controlling and generating power. • Explore the design, construction, and support methods of tunnels and caverns used in hydropower projects and analyze the systems and techniques for ventilation, lighting, mucking, and hauling in tunnels to ensure safe and efficient operations.

Eligibility	Students pursuing Diploma/ UG / PG Programs in Civil Engineering		
Pre Requisites	Fluid Mechanics, Applied Hydraulics, Water Resources Engineering		
Target Segment	Students pursuing Diploma/ UG / PG Programs in Civil Engineering Faculties / Working Professionals in the above domain & other aspiring learners		
Course Content	See Enclosed Programme details – as Annexure 1		
Pedagogy	Online Self paced E-Learning Content		
Assessment	One Final Assessment		
Programme Faculty	L&T Industry Experts		
Duration	Units : 5 Hours : 8		
Class Schedule	Self-Paced		
Programme Highlights/USPs	<ul style="list-style-type: none"> • Hydropower components • Headworks • Hydromechanical components • Tunnel and Cavern 		
Programme Mentor	<p>Ashutosh Mohod - Engineering Manager in Hydel EDRC of L&T Construction, Heavy Civil IC</p> <p>He holds a Master of Technology (M. Tech) in Structural Engineering from NIT Jamshedpur. He has been working in the field of Hydel engineering for the past 10 years, focusing on the design of various civil structures. He has published a paper titled "Buckling Analysis of Composite Laminated Plate" in the Structural Engineering Convention 2014 at IIT Chennai. He is actively engaged in the design and development of civil engineering projects.</p>		
Total Fees		Total Fees (Rs.)	
	Total Programme Fee	Rs 1,900/- inclusive of tax	

ANNEXURE 1

Proposed Course outline / programme / plan – Unit wise syllabus details.

Unit - I: Introduction to Hydropower Components
Different components of hydropower projects - Headwork - Barrage and Weir, Diversion Arrangement and Intake structures - Components of diversion and storage headworks - Desilting Chamber and Water Conductor System - Surge shaft and power house - Major dams in India

Unit - II: Components in Hydropower Projects
Non-overflow section, overflow section and galleries in dams - Energy dissipators - Instrumentation in dams - River training works - Cross drainage works

Unit - III: Miscellaneous Components in Hydropower Projects
Retaining wall – Switchyard - Anchor blocks - Tail race channel - Bridges over dam – Turbines - Valves

Unit - IV: Hydromechanical components
Hydromechanical equipment - Different types of gates and their selection - Trash rack and Trash rack cleaning machines

Unit -V: Tunnel and Cavern
Tunnel and cavern - Geotechnical or geophysical investigation and site survey - Types of tunnel support - Methods for rock support design of tunnels - Types of tunneling – Ventilation, lighting in tunnels – Mucking & Hauling - Instrumentation and monitoring - Shaft and shaft sinking operations – Safety in Tunnels