

Construction of Metro Rail Systems

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| Course Name | Construction of Metro Rail Systems |
| Course Name as on Certificate | Construction of Metro Rail Systems |
| Certificate Type | Certificate of Completion by IITM Pravartak and L&T EduTech |
| Certificate Issued by | IIT MADRAS and L&T EduTech |
| Course Objectives | <ul style="list-style-type: none"> • Understand the methods for assessing surface conditions and subsurface investigation techniques to effectively evaluate geological conditions for metro construction projects. • Gain insights into laboratory and in-situ testing techniques for analyzing the mechanical behavior of rocks and soils, ensuring structural integrity and stability in metro construction. • Discuss the construction methods of elevated stations and viaducts, including substructure construction techniques and challenges encountered in foundation construction for elevated metro structures. • Explore the development of precast yards for efficient production and assembly of precast elements in metro viaduct construction, enhancing construction productivity and quality. • Understand the principles and applications of various tunneling methods, such as cut and cover, boring, drill and blast, NATM, and NMT, in metro tunnel construction, considering geological conditions and engineering requirements. • Explore support systems and construction techniques for underground metro stations, including diaphragm walls, top-down, and bottom-up construction methods, ensuring stability and safety during station construction. |
| Eligibility | Students pursuing Diploma/ UG / PG Programs in Civil Engineering |
| Pre Requisites | Soil Mechanics, Foundation Engineering, Structural Analysis |
| 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 Program details – as Annexure 1 |
| Pedagogy | Online Self-paced E-Learning Content |
| Assessment | One Final Assessment |
| Programme Faculty | L&T Industry Experts |

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| Duration | Units: 5 Hours : 10 | | |
| Class Schedule | Self-Paced | | |
| Programme Highlights/USPs | <ul style="list-style-type: none"> • Site investigation for Metro Rail Projects • Metro Viaduct erection methods • Challenges in Metro Rail construction • Precast yard development for Metro projects • Tunnel Construction methods | | |
| Programme Mentor | <p>T Cibin Engineering Manager -Metros, Heavy Civil Infrastructure, L&T Construction A Professionally motivated Structural Engineer with 12 years of experience in Design of Reinforced Concrete, Structural Steel, Composite, Timber and Masonry structures. Possess a diverse experience in Heavy Civil Engineering including Underground Metros, Tunnels, Defence & Marine Structures</p> | | |
| Total Fees | | Total Fees (Rs.) | |
| | Total Programme Fee | Rs 1,900 /- inclusive of Tax | |

ANNEXURE 1

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

Unit - I : Site Investigations

Surface and subsurface investigations, in-situ testing methods for rocks and soil, in-situ testing methods for rocks and soil

Unit - II : Elevated Metro Viaducts and stations

Elevated Metro viaducts , Metro Viaduct Erection methods, Pre-Cast Yard Development , Formwork in metro projects , Substructure construction methods , challenges in foundation construction of Metros

Unit - III Construction methods of Metro Rail Tunnels

Rock mass classification, Cut and cover method, Drill and blast method, NATM,NMT, Comparison between NATM and NMT

Unit - IV : Tunnel Support systems

Tunnel support systems, Rock Bolts, Anchors , shotcrete, Reinforced Rib Shotcrete ,Lattice girders and steel arches. Pre excavation support systems , Introduction to Pre excavation support systems ,Purpose of Pre excavation support systems ,Ground Freezing method ,Umbrella arch method -I, Face grouting ,Pre grouting and Types of Pre grouting

Unit - V : Tunnel Monitoring

Introduction and purpose of instrumentation and monitoring, Instrumentation and monitoring planning, Typical geotechnical measuring systems for underground tunnels ,Typical geotechnical measuring systems for underground tunnels ,Loads and stresses in support system and water pressure monitoring, Project case study , Trigger limits and monitoring plan