Autodesk Civil 3D for Dry Utilities Networks: Electrical Power, Street Lighting, Telecommunications, Gas and Utility coordination

1. Target Audience

This course is intended for civil engineers, utility designers, infrastructure professionals, CAD/BIM technicians, land-development designers and Civil 3D users involved in planning and coordinating underground and above-ground dry utility networks.

Prerequisites

Participants should have:

- Basic knowledge of AutoCAD or Autodesk Civil 3D
- Basic understanding of civil drawings and underground utilities
- Familiarity with surfaces, alignments and profiles is helpful but not mandatory

2. Course Objective

The objective of this course is to provide practical skills for planning, modelling, coordinating and documenting dry utility networks using Autodesk Civil 3D. The course covers electrical power, street lighting, telecommunications and fibre-optic systems, gas distribution, common utility corridors, crossings, quantities and construction documentation.

3. Course Outcomes

After completing this course, participants will be able to:

- Prepare survey, surface, alignment and profile data for dry utility design.
- Develop utility corridors, trench routes, duct banks and service connections.
- Configure suitable Civil 3D parts, styles, labels and network representations.
- Model electrical, street-lighting, telecom, fibre and gas utility layouts.
- Control horizontal routing, depth, cover, elevations and crossing clearances.
- Coordinate dry utilities with roads, grading, structures and wet utility networks.
- Generate plan-profile drawings, schedules, quantity reports and construction details.
- Complete an integrated, coordinated dry-utilities design project.

4. Course Outline

The course comprises **24 hours** of theory, software demonstrations and hands-on lab exercises divided into eight modules. Participants will complete a practical project covering electrical, street lighting, telecommunications, gas and multidisciplinary utility coordination.

Table of Contents

Module 1: Introduction to Dry Utilities and Civil 3D Workflow

- Understanding dry utilities: power, street lighting, telecommunications, fibre and gas.
- Underground versus above-ground utility systems.
- Typical components: conduits, cables, duct banks, trenches, vaults, handholes, poles, cabinets and valves.
- Civil 3D tools used for utility routing and 3D representation.
- Project templates, units, coordinate systems, layers and external references.
- Overview of the complete dry-utility design and coordination workflow.

Hands-on Exercise: Set up a coordinated Civil 3D dry-utilities project.

Module 2: Base Data and Utility Corridor Planning

- Importing survey, topographic and existing-utility information.
- Creating and reviewing existing-ground and proposed-ground surfaces.
- Using road alignments, profiles, parcels and site plans as design references.
- Identifying utility entry points, service zones and connection locations.
- Planning utility corridors, easements and common trench routes.
- Establishing horizontal and vertical design controls.

Hands-on Exercise: Prepare a surface, alignment and profile for a proposed dry-utility corridor.

Module 3: Network Standards, Parts, Styles and Labels

- Selecting suitable Civil 3D modelling methods for different dry utilities.
- Using pressure networks, pipe networks, alignments, profiles and feature lines as utility representations.
- Configuring catalogues, parts lists and custom utility components.
- Creating styles for conduits, duct banks, trenches, structures and appurtenances.
- Defining utility colours, line types, layers and naming conventions.
- Creating plan, profile and crossing labels.

Hands-on Exercise: Configure parts, styles and labels for a standardised dry-utilities template.

Module 4: Electrical Power and Street-Lighting Networks

- Planning high-voltage, low-voltage and service routes.

- Modelling conduits, duct banks, trenches and cable routes.
- Placing substations, transformers, feeder pillars, cabinets, pull boxes and utility chambers.
- Creating branches and building service connections.
- Planning street-lighting routes, poles and feeder connections.
- Controlling utility depth, cover, bends and road crossings.
- Displaying and editing electrical networks in plan and profile views.

Hands-on Exercise: Create an electrical and street-lighting layout with duct banks, chambers, poles and service connections.

Module 5: Telecommunications and Fibre-Optic Networks

- Understanding telecom routes, fibre ducts and communication corridors.
- Modelling multi-way conduits, microduct routes and spare ducts.
- Placing handholes, manholes, cabinets, joint boxes and equipment locations.
- Creating backbone, branch and property service routes.
- Managing road, railway and watercourse crossings.
- Applying route identification, duct occupancy and asset labels.
- Producing plan and profile representations for telecom networks.

Hands-on Exercise: Design a telecom and fibre network with chambers, branches and service connections.

Module 6: Gas Distribution and Common Utility Corridors

- Understanding gas mains, service lines, valves, markers and protection requirements.
- Creating gas routes using Civil 3D pressure-network or alignment-profile workflows.
- Placing bends, tees, valves, end connections and service branches.
- Controlling depth, minimum cover and vertical changes.
- Planning common trenches and shared utility corridors.
- Coordinating separation between gas, power, telecom and wet utilities.
- Developing typical trench, duct-bank and utility-crossing sections.

Hands-on Exercise: Create a gas network and coordinated common-utility corridor with typical sections.

Module 7: Multidisciplinary Coordination and Quality Checks

- Coordinating dry utilities with roads, grading, walls, foundations and structures.
- Coordinating electrical, telecom and gas systems with water, sewer and storm networks.
- Reviewing horizontal separation, vertical clearance, cover and crossing levels.
- Using 3D views and available interference-check workflows to identify conflicts.
- Resolving utility congestion at junctions and constrained corridors.
- Using data references, external references and shared-coordinate workflows.
- Applying design review, issue tracking and quality-control checks.

Hands-on Exercise: Identify and resolve conflicts in a multidisciplinary utility model.

Module 8: Documentation, Quantities and Integrated Final Project

- Creating utility plan and profile sheets.
- Preparing utility composite plans and crossing schedules.
- Adding labels, legends, notes, profile bands and construction annotations.
- Generating conduit lengths, duct-bank lengths, trench lengths and structure counts.
- Preparing equipment, chamber, pole and appurtenance schedules.
- Extracting quantities and producing material reports.
- Applying drawing standards and final quality-control checks.
- Completing an integrated dry-utilities design and documentation project.

Hands-on Exercise: Produce a coordinated dry-utilities model with plan, profile, sections, schedules, quantities and construction drawings.
