Power, efficiency, stability. Explore the possibilities that 12d Model delivers to your civil surface modelling projects.

Standard Training Prospectus.
Explore the possibilities of civil surface modelling with 12d Solutions. Understand the power and efficiency of 12d Model and learn how to apply that power to your civil surface modelling projects.

12d UK offers a full range of formal training courses for our clients. This prospectus outlines the standard courses available and helps you to choose the most appropriate training programme to suit your needs.

We conduct regular training sessions which can be held onsite in your office or at a venue of your choice. We also offer tailored training options customised to your specific requirements.

Note: All 12d Training course attendees are issued with comprehensive course notes, ensuring you get the most out of the experience on the day, and after as useful reference material.

Basic training course progression

**Basic**
- Introduction to 12d Model
  - 1 day course recommended for all new users

**Intermediate**
- Survey Course
  - 1 day course
  - Survey data reduction, editing & upload
- Flood Modelling
  - 1 day course
  - Covers the interface between 12d and flood modelling packages.
- Urban Drainage
  - 1 day course
  - Designing drainage networks in 12d (inc. WinDes Interface).
- Civil Design
  - 2 day course
  - All the standard options required for a 12d Civil designer.
- Visualisation
  - 1 day course
  - Creating fast and effective visualisation in 12d Model.

**Advanced**
- 12d Field
  - 2 day course
  - Construction setout functions for surveyors in the field.
- Drainage Analysis
  - 1 day course
  - Hydraulics and hydrology using 12d
- Advanced
  - 1 day course
  - Principles of parametric design.
- Road Widening & Overlay
  - 1 day course
  - Calculate pavement construction layers, volumes & widening.
- Other Advanced Courses
Introduction to 12d Model (one day basic course)

**Prerequisites:**
This session is intended for new users of 12d Model. No experience in 12d Model is necessary but basic computer skills are required. Participants will gain more from the course if they have worked through the first part of the 12d Model *Getting Started for Design Manual.* The course is ideal for those who need an understanding of the basic concepts using 12d Model.

**Course Content:**
- Navigate in 12d Model's graphical user interface.
- An overview of 12d's file structure and strings types.
- Read data into 12d Model, and triangulate that data to form a Digital Terrain Model.
- Create contour strings from the DTM.
- Create plan, section and perspective views and view the DTM in these views.
- Create different types of strings in 12d Model, and understand the different uses that can be made of the strings.
- Edit and modify the elevation and location of the strings.
- Explore the COGO functionality in 12d Model.
- Analyse a pad foundation using 12d Model. Vary the level of the foundation to balance earthwork volumes. View the completed design in a perspective view.
- Analyse a site based on the topographic survey to determine areas suitable for development.
- Creating the outline of a building pad, and determine the footprint of the pad on the existing surface. Analysing the volume of the pad by both cross section and exact (prismoidal) methods.
- Varying the level of the pad to balance earthwork volumes. Viewing the completed design in a perspective view.
- Creating an outline of the floor and top of a detention basin. Creating a model of the detention basin, and shading the basin walls based on slope.
- Analysing the storage volume available in the detention basin, both for the whole basin, and in depth increments (determine the storage curve).
- Creating a "striped" surface for the basin, and determining topsoil volume. Analysing volumes between the floor of the basin and the stripped surface.
- A thorough review of the sharing options inside 12d Model, allowing all users to share data with users within their companies throughout the world.

Civil Design (2 day intermediate course)

**Prerequisites:**
Experience in 12d Model with completion of the One Day Introduction to 12d Model Course or working through the “Getting Started for Design” manual is required.

**Course Content:**
- Importing survey data using map file
- Create a tin (triangulated irregular network) of survey data.
- Create and edit the horizontal and vertical geometry of a road alignment.
- Create and edit road templates
- Applying templates along an alignment string (apply many function)
- Checking for service interference
- Viewing and assessing the road design (including drive through of new road)
- Tools to edit the road alignment, and run the design again. Observe changes in cut and fill volumes, and extent of cut and fill.
- Adding road intersections using fillets as a kerb returns, 3 centred curve and the automatic kerb return function to grade the kerb returns.
- Introduction to element (parametric) design tools
- Apply templates to the kerb returns to complete the intersection and inspect the intersection in Perspective view.
- Modifying templates to include super-elevation and curve widening
- Create pavement construction layers (boxing) and calculate the volume of road material.
- Creating road triangulations (tins) and calculating volumes
- Merging road tin with existing surface
- Plotting plan, long and cross sections in 12d Model
- Introduction to chains.
Civil Design Advanced (one day advanced course)

**Prerequisites:**
This course is only for experienced 12d Model civil designers only. Completion of two day Civil Design course (or equivalent experience) is essential.

**Course Content:**
- Designing super alignment strings using speed tables (defined by the DMRB).
- Comprehensive outline of element (parametric) design tools (super alignment).
- Overview of computators, which allows super alignment geometry to linked to other geometry in a project. If that linked geometry is altered, the super alignment can be updated by 12d.
- Through review of chain commands (which allow users to automate repetitive steps).
- Creation of a roundabout using a combination of element method, chains and computators.
- Using the “Mutiple boxing” option allows users to create pavement construction layers and calculate the volume of road material.
- A comprehensive look at the additional options in the “Apply Many” function (this includes visualisation mapping, tin and sight distances and tadpoles).
- An overview of Decisional Templates which gives the designer additional control over things such as complex batter treatment, fill requirements depending on height, Forced table drains etc.
- Design visualisation (including surface textures, road furniture and line markings).

Overlay and Widening (one day advanced course)

**Summary**
This course takes the user through a typical overlay and widening civil design project. The analysis is carried out using variable depths and crossfalls, design surface triangulation and depth isopach comparisons.

The project utilises a compilation of overlay and full road reconstruction and their associated subgrade design requirements

**Prerequisites:**
For experienced 12d Model users only. Completion of 2 day Civil Design course and Advanced Civil Design course is essential.

**Course Content:**
- Introduction to Overlay Concepts.
  - setting up the data required
  - getting familiar with Overlay Panel and terminology
  - looking at outputs such as spreadsheets and plots
- Creating Design Surface
  - by initial analysis of existing surface to locate areas of superelevation, good and sub-standard crossfalls
  - refining design to optimise balance of materials used, scarification and design standards
- Generating Pavement Design
  - by defining subgrade and intermediate pavement layers
  - applying new techniques to locate critical points for the pavement construction
- Automating Re-work
Drainage and Utility Service Design (one day intermediate course)

**Prerequisites:**
Experience in 12d Model with completion of the *One Day Introduction to 12d Model Course* or working through the "Getting Started for Design" manual is required.

**Course Content**
- Import data into 12d Model, and triangulating to form a surface.
- Extract the strings that are useful to a drainage designer from the road design.
- Combine surfaces to create a “supertin” which is used in the drainage design.
- Create a sewer drainage network, and checking that the automatic pipe grading created by 12d Model will allow the entire system to drain.
- Create "superstrings" to model underground services, and checking for clashes with the sewer drainage line.
- Create a stormwater drainage system, and checking for clashes with other services, and with the sewer line.
- Adjust the levels of the pipe inverts to provide clearance to the other services, and exploring the different methods to achieve this.
- Complete overview of 12d Model's direct interface with WinDes.
- Produce drainage longsections with user defined data.

Drainage Analysis using 12d Model (one day advanced course)

**Prerequisites:**
Experience in 12d Model with completion of the *One Day Drainage and Utility Service Design Course* or equivalent experience is required.

**Course Content:**
- use the powerful new network editor to set catchment parameters for the rational method hydrology using multiple catchment areas per manhole to determine time of concentrations from length –slope strings
- Multiple techniques to calculate setout coordinates and elevations
- Run the new 12d Drainage Design Module to size pipes and box culverts, set inverts and produce reports
- Pit pressure loss Coefficients (K) in 12d Storm analysis
- Design with inlet capacities
- Create and alter pit types to model "on grade" and SAG inlet capacity
- Analyse flooded areas resulting from ponding or surcharge volumes at SAG pits
- Bypass flow with detailed inlet capacity calculations in 12d Storm Analysis
- Customise pit schedule reports through spreadsheet interface
- Drainage quantities report. Customise pipe and pit quantity reports by type and depths. Use 12d templates to calculate trench volumes
- Create MH symbols (for pit types) for placement on customised plan drawings
- Produce drainage plan drawings with user defined data, pipes as linestyles and manholes as symbols.
- Produce customised drainage longsections with hatching under roads and adding of user defined data
Flood Modelling using 12d Model (one day intermediate course)

**Prerequisites:**
Experience in 12d Model with completion of the One Day Introduction to 12d Model Course or working through the “Getting Started for Design” manual is required. Users should also be familiar with packages such as HEC RAS, ISIS, TUFLOW, Mike11 etc which 12d Model will interface with during the training session.

**Course Content:**
- Reading survey data into 12d Model, and triangulating that data to create a surface. Inspecting contours, and determining the location of overbanks.
- Locating cross sections along the channel (both manually, and automatically).
- Using 12d Model to create a HEC-RAS "Project".
- Using HEC RAS to determine flood water levels along the channel.
- Adding "Interpolated" cross sections in HEC-RAS and reading these back to 12d Model.
- Reading the flood water levels back into 12d Model, and forming a water surface. The use of "Shape" strings, and HEC-RAS "Interpolated" sections.
- Creating depth contours, and colouring the water surface by depth.
- Creating a Perspective view of the channel, showing the area of inundation
- Plotting longitudinal profiles, and cross sections of the channel.

Visualisation in 12d Model (one day intermediate course)

**Summary:**
Project Visualisation has moved in leaps and bounds since it was first introduced into 12d Model. Some clients are now requesting users to produce 3d images of their projects to better understand and explain the finished project to prospective stakeholders.

**Prerequisites:**
This session is intended for skilled users of 12d Model who wish to extend their skills into visualisation and the presentation of projects for clients.

**Course Content:**
- The creation of a composite surface (tin).
- Draping Raster Arial photographs onto the finished surface.
- Creating and applying the many standard 12d model textures and colours to the tin surface.
- The application of modelled roadside furniture using extruded shapes (e.g. guide posts, guard rails, street lighting, fences).
- The placement of billboard images such as trees, shrubs, traffic signs etc at specified locations.
- The addition of on-site digital photos as backdrops.
- The production of AVI Movies to create the finished product.