Training Courses

North America

Select Course by Profession

Geologist Open Pit Metalliferous	Geologist Open Pit Stratigraphic	Geologist Underground Metalliferous	Geologist Underground Stratigraphic	Geotechnical Engineer	Geostatistician
Engineer Open Pit Metalliferous	Engineer Open Pit Stratigraphic	Engineer Underground Metalliferous	Engineer Underground Stratigraphic	Surveyor	Scheduler

Select Course by Software

Vulcan™	I-Site™	Evolution

Courses by Career

Engineer: Underground Metalliferous

Engineer: Underground Stratigraphic

Engineer: Open Pit Metalliferous

Engineer: Open Pit Stratigraphic

Geologist: Underground Metalliferous

Geologist: Underground Stratigraphic

Geologist: Open Pit Metalliferous

Geologist: Open Pit Stratigraphic

Geotechnical Engineer

Geostatistician

Scheduler

Surveyor

Vulcan™ Courses

Advanced Triangulations

Batch Plotting and Data Presentation

Block Modelling for Geologists

Block Modelling for Mining Engineers

Build Your Own Course

Chronos

Chronos Optimization

Dragline

Geologic Grid Modelling

Geologic Sample Databases

Geology Tools

Geostatistics

Geotechnical Tools

Grade Control

Grid Mine Models and Macros

HARP Modelling

Haulage Profile

Implicit Modelling Workshop

Introduction to Lava Scripts

Introduction to Plotting

Introduction to Vulcan

Introduction to Vulcan – Stratigraphic

Interactive Road Design

Multivariate Geostatistics

Oil Sands Options

Open Pit Design

Open Pit Design – Stratigraphic

Open Pit Drill and Blast

Pit Optimization

Script with CSH

Sequential Indicator Simulation

Short Term Planning

Simulation

Stope Optimization

Survey

Underground Design

Underground Design – Stratigraphic

Underground Ring Design

Unfolding Workshop

Vulcan Gantt Scheduler

Vulcan Refresher

Evolution Course

Evolution Workshop

I-Site™ Courses

Advanced Processing and Volumetrics - Open Pit

Advanced Processing and Volumetrics - Underground

Build Your Own Course

Introduction to I-Site Studio

I-Site Field Scanning

I-Site for Geological and Geotechnical Applications

Courses by Career

Engineer: Underground Metalliferous

Introduction to Vulcan

Advanced Triangulations

Introduction to Plotting

Batch Plotting and Data Presentation

Block Modelling for Mining Engineers

Stope Optimization

Underground Design

Underground Ring Design

Grade Control

Short Term Planning

Vulcan Gantt Scheduler

Script with CSH

Introduction to Lava Scripts

Build Your Own Course

Engineer: Underground Stratigraphic

Introduction to Vulcan – Stratigraphic

Advanced Triangulations

Introduction to Plotting

Batch Plotting and Data Presentation

Grid Mine Models and Macros

Underground Design – Stratigraphic

Vulcan Gantt Scheduler

Script with CSH

Introduction to Lava Scripts

Build Your Own Course

Engineer: Open Pit Metalliferous

Introduction to Vulcan

Advanced Triangulations

Introduction to Plotting

Batch Plotting and Data Presentation

Block Modelling for Mining Engineers

Pit Optimization

Open Pit Design

Open Pit Drill and Blast

Interactive Road Design

Haulage Profile

Open Pit Drill and Blast

Grade Control

Short Term Planning

Chronos

Chronos Optimization

Evolution Workshop

Script with CSH

Introduction to Lava Scripts

Build Your Own Course

Engineer: Open Pit Stratigraphic

Introduction to Vulcan – Stratigraphic

Introduction to Plotting

Batch Plotting and Data Presentation

Grid Mine Models and Macros

Open Pit Design – Stratigraphic

Interactive Road Design

Haulage Profile

Open Pit Drill and Blast

Dragline

Short Term Planning

Chronos

Chronos Optimization

Evolution Workshop

Script with CSH

Introduction to Lava Scripts

Oil Sands Options

Build Your Own Course

Geologist: Underground Metalliferous

Vulcan Courses

Introduction to Vulcan

Advanced Triangulations

Implicit Modelling Workshop

Introduction to Plotting

Batch Plotting and Data Presentation

Geologic Sample Databases

Geology Tools

Geotechnical Tools

Block Modelling for Geologists

Grade Control

Geostatistics

Simulation

Sequential Indicator Simulation

Multivariate Geostatistics

Script with CSH

Introduction to Lava Scripts

Build Your Own Course

I-Site Courses

Introduction to I-Site Studio

I-Site for Geological and Geotechnical Applications

Build Your Own Course

Geologist: Underground Stratigraphic

Vulcan Courses

Introduction to Vulcan – Stratigraphic

Advanced Triangulations

Introduction to Plotting

Batch Plotting and Data Presentation

Geologic Sample Databases

Geology Tools

Geotechnical Tools

Geologic Grid Modelling

Grid Mine Models and Macros

HARP Modelling

Geostatistics

Simulation

Sequential Indicator Simulation

Multivariate Geostatistics

Script with CSH

Introduction to Lava Scripts

Unfolding Workshop

Build Your Own Course

I-Site Courses

Introduction to I-Site Studio

I-Site for Geological and Geotechnical Applications

Build Your Own Course

Geologist: Open Pit Metalliferous

Vulcan Courses

Introduction to Vulcan

Advanced Triangulations

Implicit Modelling Workshop

Introduction to Plotting

Batch Plotting and Data Presentation

Geologic Sample Databases

Geology Tools

Geotechnical Tools

Block Modelling for Geologists

Grade Control

Geostatistics

Simulation

Sequential Indicator Simulation

Multivariate Geostatistics

Script with CSH

Introduction to Lava Scripts

Build Your Own Course

I-Site Courses

Introduction to I-Site Studio

I-Site for Geological and Geotechnical Applications

Build Your Own Course

Geologist: Open Pit Stratigraphic

Vulcan Courses

Introduction to Vulcan – Stratigraphic

Advanced Triangulations

Introduction to Plotting

Batch Plotting and Data Presentation

Geologic Sample Databases

Geology Tools

Geotechnical Tools

Geologic Grid Modelling

Grid Mine Models and Macros

HARP Modelling

Geostatistics

Simulation

Sequential Indicator Simulation

Multivariate Geostatistics

Script with CSH

Introduction to Lava Scripts

Unfolding Workshop

Oil Sands Options

Build Your Own Course

I-Site Courses

Introduction to I-Site Studio

I-Site for Geological and Geotechnical Applications

Build Your Own Course

Geotechnical Engineer

Vulcan Courses
Introduction to Vulcan

Advanced Triangulations

Introduction to Plotting

Batch Plotting and Data Presentation

Geotechnical Tools

Build Your Own Course

I-Site Courses
Introduction to I-Site Studio

I-Site for Geological and Geotechnical Applications

Build Your Own Course

Geostatistician

Introduction to Vulcan

Advanced Triangulations

Implicit Modelling Workshop

Introduction to Plotting

Batch Plotting and Data Presentation

Geostatistics

Simulation

Sequential Indicator Simulation

Multivariate Geostatistics

Script with CSH

Introduction to Lava Scripts

Unfolding Workshop

Build Your Own Course

Scheduler

Introduction to Vulcan

Short Term Planning

Chronos

Chronos Optimization

Evolution Workshop (Evolution)

Vulcan Gantt Scheduler

Build Your Own Course

Surveyor

Vulcan Courses
Introduction to Vulcan

Survey

Advanced Triangulations

Introduction to Plotting

Batch Plotting and Data Presentation

Script with CSH

Build Your Own Course

I-Site Courses
I-Site Field Scanning

Introduction to I-Site Studio

Advanced Processing and Volumetrics - Underground

Advanced Processing and Volumetrics - Open Pit

I-Site for Geological and Geotechnical Applications

Build Your Own Course

Vulcan™ Courses

Advanced Triangulations

Duration: 2 days

Who should take this course: Geologists, Mining Engineers and Surveyors

Practice and master triangulation skills in this interactive, two-day workshop. Discover tools that help you create, update and repair triangulation surfaces and complex solids. Explore techniques to create and update geologic ore zones, faults, underground development and pit topographies easily. Efficiently create valid triangulations for additional Vulcan tasks such as block modelling, reserves and scheduling.

Pair this course with *Block Modelling for Geologists* for robust geologic modelling skills.

Course Outline
- Explore tools to quickly and effectively ensure valid triangulations
- Quickly create triangulation models from drillhole data with Implicit Modelling tools
- Learn techniques to update existing surfaces and solids
- Easily associate an image or custom color scheme to triangulations
- Apply custom primitive shapes to existing design data to create valid triangulation solids
- Easily associate an image or custom color scheme to triangulations
- Discover the power of batch plotting triangulation data

Prerequisites
- *Familiar with Envisage*
- *Experience creating and manipulating Vulcan triangulations*

Batch Plotting and Data Presentation

Duration: 1 day

Who should take this course: Geologists, Mining Engineers and Surveyors

Create engaging presentations of Vulcan data with a robust suite of tools. Showcase your design in a 3D PDF file. Embed and rotate data into presentations with NGRAIN®. Easily create several professional plots with Batch Plotting. Take your presentation to the next level with custom batch plotting layouts and symbols.

Pair this course with *Introduction to Plotting* for a complete set of plotting and presentation skills.

Course Outline
- Showcase your designs in 3D PDF files
- Allow those without a Vulcan license to view data with NGRAIN®
- Streamline plotting with custom plotting templates for Batch Plotting
- Enhance Envisage designs and plots with custom symbols
- Easily create multiple batch plotting specifications for reproducible plots
- Embed videos into presentations

Prerequisites
- *Experience with Envisage*
- *Familiar with triangulations*
- *Basic understanding of Vulcan Isis databases and drillhole display*

Block Modelling for Geologists
Duration: 3 days

Who should take this course: Geologists

Represent your deposit with an intuitive and visually engaging Vulcan block model. Ensure accurate data with intuitive validation tools. Gain understanding of your deposit with robust statistical reports. Create and estimate a block model using existing triangulations and drillhole assays. Learn to create scripts to prepare the geologic model for mine design. Generate appealing and informative block model plots.

Pair this course with an *Implicit Modelling Workshop*, *Advanced Triangulations* or *Unfolding Workshop* for robust modelling knowledge.

Consider *Script with CSH* or *Introduction to Lava Script* to streamline modeling processes.

Course Outline
- Generate statistical spreadsheets and graphs
- Generate composite databases
- Create both standard and rotated block models from an existing data set
- Learn to estimate the block model with Inverse Distance and Nearest Neighbor methods
- Discover the power of block calculation scripts
- Explore many different methods used to view and query block models
- Calculate reserves from a populated block model
- Create useful block model plots

Prerequisites
- *Familiar with Envisage*
- *Experience creating and manipulating triangulations and/or wireframes*
- *Proficient with Vulcan Isis databases*

Block Modelling for Mining Engineers
Duration: 2 days

Who should take this course: Mining Engineers

Understand block models like never before with this informative course for Mining Engineers. Explore basic block model creation and estimation techniques. Learn to manipulate an existing geologic block model for mine design. Learn to write and utilize scripts to populate blocks with useful values such as cost of mining or ounces of gold. Learn to generate reserves reports and create block model plots.

Consider *Script with CSH* or *Introduction to Lava Script* to streamline modeling processes.

Course Outline
- Create a simple block model from an existing data set
- Understand basic grade estimation principles
- Discover the power of block calculation scripts
- Explore many different methods used to view and query block models
- Learn to manipulate the geologic model for use in mine design
- Calculate reserves from a populated block model
- Create useful block model plots

Prerequisites
- *Familiar with Envisage and triangulations*
- *Understand databases*

Build Your Own Course
Duration: varies

Who should take this course: Geologists, Mining Engineers, Surveyors, Supervisors

Create a course to meet the needs of your operation. Some ideas are listed below, but the list is not comprehensive. Contact your local Maptek office to schedule your unique class.

Course Ideas
- Basic geostatistics review, variography and implicit modelling
- Create a CSH script to automate an existing time-consuming process
- Learn data validation tools to validate a specific process
- Streamlined workflow training
- Blend I-Site with Vulcan training courses for survey positions
- Add abbreviated block modelling or triangulation training to a scheduling course
- Combine existing courses with custom durations

Prerequisites
- *Varies*

Chronos
Duration: 3 days

Who should take this course: Mining Engineers and Schedulers (Open Pit)

Learn how Chronos can help you create an efficient short or long-term schedule of your open pit operation. Learn how to configure a Chronos workbook for optimum performance. Import reserves generated from Vulcan data directly into Chronos for scheduling. Explore how Interactive Design and Scheduling (IDS) tools can streamline workflow. Create succinct scheduling reports with customized parameters.

Course Outline
- Calculate and import mining block reserves to create an effective Chronos workbook
- Configure a project calendar, processes and destinations for mined materials
- Define basic block mining precedences
- Create a schedule from input mining blocks
- Summarize the schedule in period and general reports
- Learn to interactively create a short-term schedule with IDS functionality

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of block models, reserving and open pit*
- *Familiar with triangulations*

Chronos Optimization
Duration: 3 days

Who should take this course: Mining Engineers and Schedulers (Open Pit)

Take your Chronos schedule to the next level with CPLEX optimization. Learn to define detailed mining precedences for multiple scenarios. Configure constraint tables to minimize or maximize extraction of specific materials when mining blocks. Consider pit pushbacks when optimizing the final schedule. Create succinct scheduling reports with customized parameters.

Note: This course can be taught in a single day as an add-on to *Chronos*.

Course Outline
- Import reserves and create an effective Chronos workbook
- Configure a project calendar, processes and destinations for mined materials
- Set-up constraint tables for numerous material targets
- Define detailed mining precedences for multiple scenarios
- Review basic Chronos functionality
- Consider pit pushback sequencing criteria
- Create a schedule using CPLEX optimization
- Summarize the schedule in period and general reports

Prerequisites
- *Experience with Envisage and Chronos*
- *Proficient with CAD design*
- *Understanding of block models and reserving*
- *Familiar with triangulations*

Dragline
Duration: 1 day

Who should take this course: Mining Engineers (Stratigraphic)

Quickly plan and simulate material movement in your stratigraphic strip mine. Visually assess material moved by draglines, bulldozers, trucks and shovels to develop a series of optimized range diagrams. Learn to create macros, which automate processes and save design time. Generate reports and plots for dig sequences.

Course Outline
- Learn how to configure Dragline for your machinery
- Evaluate multiple dragline scenarios
- Generate reports and plots that summarize dragline productivity
- Compose macros, which are used to automate processes

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of grid models*

Geologic Grid Modelling
Duration: 4 days

Who should take this course: Geologists (Stratigraphic)

Master Grid Calc and Integrated Stratigraphic Modelling tools while creating structural and quality grids that represent splitting seams in a stratigraphic deposit. Grid Calc is a suite of traditional modelling tools which allow for manipulation of existing grids and customization of modelling processes through macros. Integrated Stratigraphic Modelling offers a more user-friendly interface and streamlined, intuitive workflow.

Explore several techniques used to validate grids against drillhole data. Construct macros, which automate modelling processes and provide an auditable record of modelling procedures. Generate a mine model using established dilution, depletion, recovery and horizon thickness parameters. Calculate reserves directly from grid data with Rsvute. Generate plots to showcase grid models.

Course Outline
- Review optimal data structure for stratigraphic deposits
- Generate statistical spreadsheets and graphs
- Produce MAP files from drillhole data
- Model structural and quality grids
- Compose macros, which are used to automate processes
- Calculate reserves directly from grids with Rsvute

Prerequisites
- *Familiar with Envisage*
- *Proficient with Vulcan Isis databases*

Geologic Sample Databases
Duration: 1 day

Who should take this course: Geologists

Become a Vulcan samples database expert with one day of insightful training. Understand all compositing methods available in Vulcan. Easily populate a sample database with objects interactively mapped in Envisage. Learn to quickly import existing numerical data into an Isis samples database. Apply custom display settings to samples for easy visual identification and analysis.

Pair with *Geology Tools* for robust database and sampling knowledge.

Course Outline
- Easily populate a channel sample database from objects digitized in Envisage
- Quickly import numerical sample data into an Isis database
- Understand many compositing methods available in Vulcan
- Create and save custom sample display and label settings

Prerequisites
- *Familiar with Envisage*
- *Proficient with Vulcan drillhole databases*

Geology Tools
Duration: 2 days

Who should take this course: Geologists

Hone your basic Vulcan toolkit to geologic applications. Become an expert at Vulcan databases as you learn to validate, update and manipulate numerical data. Quickly and easily generate triangulation solids directly from drillhole data with Implicit Modelling. Learn to generate statistics and quick reserve estimates with ease. Discover how to display geophysical data along a drillhole trace. Create professional, reproducible plots with batch plotting.

Pair with *Geologic Sample Databases* for robust database and sampling knowledge.

Course Outline
- Easily create triangulations from drillhole data
- Explore Vulcan Isis databases in-depth
- Update existing triangulations to reflect new data
- Generate statistics for existing data
- Learn to create grid surfaces
- Convert grid surfaces to triangulation surfaces
- Create reproducible plots easily with batch plotting

Prerequisites
- *Familiar with Envisage*
- *Experience working with triangulations and/or wireframes*
- *Understanding of Vulcan Isis databases*

Geostatistics
Duration: 3 days

Who should take this course: Geologists

Learn to apply your geostatistical knowledge with Vulcan tools. Make grade estimations more accurate with advanced estimation techniques. Explore several tools designed to help gain a better understanding of the data and your deposit. Create and use a variogram model to complete Ordinary Kriging. Calculate reserves and generate informative plots.

Note: This course does not cover Indicator Kriging and Multiple Indicator Kriging. If these subjects are required, contact your local Maptek office for a customized quote.

Consider *Script with CSH* or *Introduction to Lava Script* to streamline modeling processes.

Course Outline
- Generate statistical spreadsheets and graphs
- Discover tools which help determine optimal block construction and estimation parameters
- Calculate experimental variograms and create variogram models
- Estimate an existing block model with Ordinary Kriging
- Learn to use Vulcan tools to validate estimation results
- Discover the power of block calculation scripts
- Calculate reserves from a populated block model
- Create useful, informative plots

Prerequisites
- *Proficient with Vulcan block model creation, manipulation and estimation*
- *Familiar with triangulations or wireframes*
- *Comprehension of variography and kriging principles*
- *Comfortable with the principles of statistical analysis*

Geotechnical Tools
Duration: 1 day

Who should take this course: Geologists

Analyze and identify potential failure locations with geotechnical tools. Understand how structural data is configured in an Isis database. Create new structural information from objects and images in Envisage. Display and analyze structural data on stereonets and rose diagrams. Generate plots which visually correlate stereonets and rose diagrams to mine design locations.

Course Outline
- Create a functional structural database
- Display structural data in Envisage with meaningful, structural symbols
- Interactively digitize new structural information from an image
- Analyze stereonets and rose diagrams to discover potential structural issues
- Visually correlate stereonets and/or rose diagrams to mine designs with plotting tools

Prerequisites
- *Familiar with Envisage and triangulations*
- *Understanding of Vulcan Isis databases*
- *Ability to read and interpret stereonets*

Grade Control
Duration: 2 days

Who should take this course: Geologists and Mining Engineers

Visually reconcile production and resource models with Grade Control tools. Correctly configure an ore control database for optimum performance. Configure advanced preferences for robust functionality. Calculate reserves on blast holes, production block models and resource models. Generate plots of ore control information.

Course Outline
- Construct and populate a Grade Control database
- Configure Advanced Preferences for robust functionality
- Explore ways to visually reconcile the production model with the resource model
- Create plots of grade control results

Prerequisites
- *Familiar with Envisage*
- *Experience with Block Models and Vulcan Isis databases*
- *Understanding of triangulations or wireframes*

Grid Mine Models and Macros
Duration: 1 day

Who should take this course: Geologists and Mining Engineers (Stratigraphic)

Create powerful Macros to automate complex grid calculations and processes. Generate a mine model which will consider dilution, depletion and minimum thickness requirements. Calculate reserves for the mine model. View and plot stratigraphic sections with ease.

Pair with *Open Pit Design – Stratigraphic* for robust stratigraphic mine modelling knowledge.

Course Outline
- Quickly review the Grid Calc interface
- Understand and compile macros
- Create a mine model from a geologic model
- Calculate reserves with Rsvute
- View and plot stratigraphic sections

Prerequisites
- *Familiar with Envisage*
- *Basic understanding of Grid Models*

HARP Modelling
Duration: 1 day

Who should take this course: Geologists (Stratigraphic)

Horizon Adaptive Rectangular Prism (HARP) models accurately and intuitively represent complex stratigraphic deposits. Easily create HARP models from existing structural and quality grids. View, manipulate and analyze the HARP model with standard block model tools. Easily generate complex reserve reports with Advanced Reserves. Create colorful, intuitive plots and batch plots.

Course Outline
- Generate a HARP model from existing grids
- Learn block viewing methods
- Quickly create a Run of Mine HARP model
- Apply strip ratios
- Calculate reserves directly from the HARP model
- Create colorful, intuitive plots of geologic or mine models

Prerequisites
- *Familiar with Envisage*
- *Experience with grid models*
- *Understanding of block models*

Haulage Profile
Duration: 1 day

Who should take this course: Mining Engineers (Open Pit)

Improve workflow and save time when designing a haulage network with Haulage Profile tools. Customize a truck library to reflect capabilities of your equipment. Calculate and store important values, such as fuel consumption, to design strings or an existing block model. Generate haulage reports and create plots of truck routes.

Course Outline
- Learn how to configure Haulage Profile for your machinery
- Design a haulage route network and save configurations to a specification file
- Calculate and store countless types of information, such as fuel consumption, grade or speed, in design string attributes or a block model
- Generate reports of haulage route information
- Create plots of haulage routes

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of block models*

Implicit Modelling Workshop
Duration: Varies

Who should take this course: New Users and Geologists

Quickly create triangulation solids directly from drillhole or sample data. Triangulations can represent geological zones or grade with specific cut off values. Incorporate existing variogram models. Guide the resulting triangulation with existing polygons.

The Implicit Modelling Workshop is an informative addition to many courses. Streamlines easily with Introduction to Vulcan, Block Modelling or Geology Tools. Alternately, Implicit Modelling can be taught independently in a half-day format either in person or via web learning.

Course Outline
- Learn tips for creating a successful Implicit Modelling specification file
- Understand the impact of panel choices
- Explore tools to help you view and validate the resulting model

Prerequisites
- *Basic understanding of Vulcan interface*
- *Experience with Vulcan triangulations*

Introduction to Lava Scripts

Duration: 3 days

Who should take this course: Geologists and Mining Engineers

Learn to create robust scripts which interact with Vulcan data and models to greatly increase productivity. Lava scripts are used to automate repetitive tasks, customize Vulcan options, or streamline lengthy or complicated processes. Discover Perl scripting basics used to create custom Lava scripts in this introductory course. Develop basic and advanced scripts, complete with user interface panels.

Add *Script with CSH* for robust scripting knowledge.

Course Outline
- Learn basic Perl syntax used to create Vulcan Lava scripts
- Understand how data structure and storage affect scripts
- Discover how to call select Vulcan menus in a lava script
- Create basic and advanced user interface panels

Prerequisites
- *Basic understanding of Vulcan*
- *Familiar with basic script functionality and structure*

Introduction to Plotting

Duration: 1 day

Who should take this course: Geologists, Mining Engineers and Surveyors

Learn to easily create professional plots of Vulcan data using Quick Plot, Plot All Wizard and Batch Plotting. Customize drafting sheet templates to easily generate standardized Plot All Wizard plots. Create plots of up to nine different views. Enhance existing plots with annotations such as text, arrows or other design objects. Create Batch Plotting specification files to easily reproduce recurring plots.

Pair this course with *Introduction to Vulcan* or *Introduction to Vulcan – Stratigraphic* for a solid Vulcan foundation. Pair with *Batch Plotting and Data Presentation* to establish a robust set of plotting and presentation skills.

Course Outline
- Improve Plot All Wizard plots with custom drafting sheet templates
- Generate custom plots of up to nine unique views
- Enhance existing plots with text or design objects
- Easily reproduce recurring plots with a batch plotting specification

Prerequisites
- *Experience with Envisage*
- *Familiar with triangulations*
- *Basic understanding of Vulcan Isis databases and drillhole display*

Introduction to Vulcan
Duration: 3 days

Who should take this course: New Users, Geologists, Mining Engineers, Supervisors and Surveyors

Establish a solid foundation of Vulcan knowledge during this comprehensive three-day course. Obtain a basic understanding of the software interface, data structure, CAD design tools, Isis databases, triangulations and grids.

Although all aforementioned topics are introduced, in-depth focus is provided to suit the needs to the class whenever possible. For example, a class of geologists would receive more information on databases and modelling, whereas a class of mining engineers would explore more CAD tools. A blended class will receive a rounded set of tools to meet the needs of all attendees.

Pair with *Introduction to Plotting* or *Batch Plotting and Data Presentation* to establish a solid Vulcan foundation.

Course Outline
- Explore and customize Vulcan's interface for intuitive use
- Discover and learn to use the most popular CAD tools
- Create a Vulcan Isis database
- Display and query drillholes
- Construct several triangulation surfaces and solids
- Perform basic triangulation manipulations
- Generate a simple grid surface

Prerequisites
- *None*

Introduction to Vulcan – Stratigraphic
Duration: 3 days

Who should take this course: New Users, Geologists, Mining Engineers, Supervisors and Surveyors (Stratigraphic)

Establish a solid foundation of Vulcan knowledge aimed to suit the needs of stratigraphic clients. Discover the CAD and triangulation tools used most often in stratigraphic environments. Learn the best practices for stratigraphic data structure. Receive an introduction to Grid Calc, which provides a solid foundation for constructing and manipulating stratigraphic, geologic models in later courses.

Pair with *Introduction to Plotting* or *Batch Plotting and Data Presentation* to establish a solid Vulcan foundation.

Course Outline
- Explore and customize Vulcan's interface for intuitive use
- Discover and learn to use the most popular CAD tools
- Create a Vulcan Isis database
- Understand optimal data structure for stratigraphic deposits
- Display drillholes with interpreted stratigraphy
- Construct and manipulate several triangulation surfaces and solids
- Receive an introduction to Grid Calc, which includes tools to create and manipulate grid surfaces

Prerequisites
- *None*

Interactive Road Design
Duration: Varies

Who should take this course: Mining Engineers or Civil Engineers

Easily create roads and road cuts that respect safety parameters with Iroad tools. Adhere to many road parameters such as width, grade or slope. Calculate and balance cut-and-fill volumes. Quickly generate a new topography triangulation that reflects your road design. Generate a report of survey locations.

Pair with *Open Pit Design* or *Haulage Profile*. Alternately, this course can be taught independently in a half-day format either in person or via web learning.

Course Outline
- Configure road parameters such as width, grade or slope
- Design a new road on an existing topography triangulation
- Balance and calculate cut and fill based upon required road parameters
- Automatically create a new topography triangulation that includes the designed road
- Generate a report of survey locations

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Familiar with triangulations*

Multivariate Geostatistics
Duration: 2 days

Who should take this course: Geologists

Understand how to model multiple correlated variables with two different techniques. Learn to model correlated variables with the stepwise conditional transform. Calculate cross variograms and generate a valid linear model of coregionalization. Apply cokriging to create robust multivariate estimates.

Consider *Script with CSH* or *Introduction to Lava Script* to streamline modeling processes.

Course Outline
- Model correlated variables using the stepwise conditional transform
- Calculate and model cross variograms
- Generate cokriging estimates

Prerequisites
- *Comprehensive experience with kriging principles*
- *Ability to create variogram models using Vulcan tools*
- *Proficient with Vulcan block model creation, manipulation and estimation*

Oil Sands Options
Duration: 1 day
Who should take this course: Geologists and Mining Engineers

The Oil Sands Options help mining sites comply with ERCB (Energy Resources Conservation Board) regulations. TV:BIP (Total Volume : Bitumen in Place) information is used to establish mining intervals and the ultimate mining floor. Learn how to incorporate dilution into the results as well as composite block intervals by bench. Create professional plots that illustrate the results stored in an existing block model.

Course Outline
- Quickly determine mineable intervals and mining depth from stored block model grades
- Evaluate the effect of dilution on resources
- Easily obtain average bench grade of block intervals
- Create plots which illustrate mineable material

Prerequisites
- *Experience with Envisage*
- *Understanding of block models*

Open Pit Design
Duration: 3 days
Who should take this course: Mining Engineers

Discover how Rapid Pit Design saves time by quickly generating many pit scenarios. Learn tips and tricks for seamless pit design with Vulcan's suite of powerful pit design tools. Quickly calculate reserves from existing design strings, or generate a formal reserve report broken by bench. Create professional bench plots of the final pit design.

Pair with *Open Pit Drill and Blast*, *Pit Optimization*, *Interactive Road Design* or *Haulage Profile* for a complete Open Pit skill set.

Course Outline
- Create multiple pit scenarios quickly with Rapid Pit Design
- Construct a final pit design easily using helpful tips
- Discover how to generate and store reserves directly in pit design strings
- Quickly update existing topography with pit design strings
- Calculate bench-by-bench reserves
- Create bench plots of the final pit design

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of block models*
- *Familiar with triangulations*

Open Pit Design – Stratigraphic
Duration: 2 days

Who should take this course: Mining Engineers (Stratigraphic)

Create an effective pit layout using information in an existing geologic model. Create and edit strip and block polygons. Learn to generate projection macros. Calculate reserves with both Rsvute and Chronos. Quickly generate mining block solids as well as useful section plots.

Pair with *Grid Mine Models and Macros* for robust stratigraphic mine modelling knowledge.

Course Outline
- Analyze and contour grids for pit layout
- Generate and edit strip and block polygons
- Layout a pit design that respects stratigraphy
- Generate and edit projection macros, which are used to automate processes
- Calculate reserves with Rsvute and Chronos
- Configure a Chronos workbook
- Visualize mineable blocks with automatically-generated solids
- Create section plots that illustrate seams and waste within the pit

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of grids*
- *Familiar with triangulations*

Open Pit Drill and Blast
Duration: 1 day

Who should take this course: Mining Engineers (Open Pit)

Discover how to layout and modify blasts for your open pit operation. Create a customized library of drill rig and explosive information. Create blast plots complete with reporting information.

Course Outline
- Populate a customized library with drill rig and explosive information
- Configure specifications that define explosive loading, blast layout and report information
- Design and edit blast layouts
- Create a plot of the blast with reporting information

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*

Pit Optimization
Duration: 1 day

Who should take this course: Mining Engineers (Open Pit)

Determine the location and shape of the best possible open pit by maximizing economic value. Account for complex geotechnical requirements and incorporate several different products, costs, and processes. Perform multiple pit analyses to calculate high level schedules and generate professional plots

Pair Pit Optimization with *Open Pit Design* for robust open pit design skills. Consider *Script with CSH* or *Introduction to Lava Script* to streamline optimization processes.

Course Outline
- Calculate necessary values into an existing block model
- Discover the result of altering several economic inputs
- Generate and analyze numerous optimized pits
- Determine which factors have the greatest impact on the ultimate pit shape
- Create professional plots of optimized pit scenarios

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of block models*
- *Familiar with triangulations*

Script with CSH
Duration: 1 day

Who should take this course: Geologists, Mining Engineers, Supervisors and Surveyors

Streamline your workflow with basic scripting skills. Automate recurring tasks to save time and avoid errors. Condense complicated workflows to single click.

This course can be customized to create scripts that address specific site challenges.

Course Outline
- Learn how to run Vulcan executables from tcsh shell
- Combine multiple executables into a script
- Schedule recurring tasks

Prerequisites
- *Experience with Vulcan*

Sequential Indicator Simulation
Duration: 1 day

Who should take this course: Geologists

This course is designed as an add-on to the *Simulation* course. Participants will explore how to perform sequential indicator simulations using Vulcan tools to assess uncertainty in domains. To create a customized sequential indicator simulation course, contact your local Maptek office for a customized quote.

Consider *Script with CSH* or *Introduction to Lava Script* to streamline modeling processes.

Course Outline
- Review indicator variography principles
- Perform sequential indicator simulation to model uncertainty in categorical variables
- Apply indicator simulation results to assess uncertainty in domains

Prerequisites
- *Previous or concurrent enrollment in the Simulation course*
- *Familiar with simulation theory and its application*
- *Proficient with Vulcan block model creation, manipulation and estimation*

Short Term Planning
Duration: 3 days

Who should take this course: Mining Engineers and Mine Planners

Vulcan offers several short-term planning tools. Explore the advantages of each tool in this interactive course. Discover tips for effective use of Sequencing Accumulation and Reporting. Learn how to effectively configure a Chronos workbook.

Consider *Script with CSH* or *Introduction to Lava Script* to streamline modeling processes.

Course Outline
- Create a simple schedule with polygons and Advanced Reserves
- Quickly create an extraction plan with Sequencing Accumulation and Reporting
- Effectively configure a Chronos workbook for short-term planning applications

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Familiar with block models and triangulations*
- *Understanding of mine planning principles*

Simulation
Duration: 3 days

Who should take this course: Geologists

This course is designed for participants who have extensive experience with block modelling, grade estimation, variography, kriging techniques and a basic understanding of simulation principles. Participants will explore how to assess uncertainty in estimates. Quantify geologic uncertainty to drive better investment decisions.

Add the one day Sequential Indicator Simulation course to apply simulation principles to categorical variables.

Pair this course with *Sequential Indicator Simulation* to complete your simulation skill set.

Consider *Script with CSH* or *Introduction to Lava Script* to streamline modeling processes.

Course Outline
- Review prerequisites and motivation for simulation
- Perform simulation with multiple variables and domains
- Generate and validate simulation results
- Assess variogram and histogram reproduction
- Apply simulation results to make informed risk-qualified decisions

Prerequisites
- *Extensive experience with kriging principles*
- *Familiar with simulation theory and its application*
- *Comprehensive understanding of variogram models*
- *Proficient with Vulcan block model creation, manipulation and estimation*

Stope Optimization
Duration: 2 days

Who should take this course: Mining Engineers (Underground)

Approximate an efficient mine design with stope optimization tools. Quickly generate several scenarios that consider established economic and mining parameters. Learn to configure stope frameworks to fit various mining methods. Generate stope design strings, triangulation solids and reserve reports. Automatically apply stope naming convention to reduce post-processing time.

Pair Stope Optimization with *Underground Design* for robust underground design skills.

Course Outline
- Generate stope design strings, triangulation solids and reserve reports
- Configure the optimization interface with economic and mining parameters
- Define both standard and irregular stope frameworks
- Learn to effectively optimize stope frameworks
- Quickly generate stopes that represent various mining methods
- Automatically implement a stope naming convention to reduce post-processing time
- Constrain resulting stope triangulations with control strings and control surfaces

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of block models*
- *Familiar with triangulations and underground mine design*

Survey
Duration: 1 day

Who should take this course: Surveyors

Keep your mine design up-to-date with survey data imported into Envisage. Learn how to apply features to imported data for continuity across your mine site. Update existing triangulations and design strings to reflect new information. Create daily plots that reflect updated mine development.

Consider *Script with CSH* to streamline workflows.

Course Outline
- Generate valid triangulations from imported scanner data
- Learn how feature codes can assure continuity in design data
- Update existing mine designs to reflect new survey pick-ups
- Create daily plan plots, which reflect the most current information

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Familiar with triangulations*

Underground Design
Duration: 2 days

Who should take this course: Mining Engineers

Create drifts, cross-cuts, ramps and stopes quickly and easily with Vulcan tools. Quickly implement a thoughtful naming convention to drastically reduce post-processing time. Rapidly generate stope and development triangulation solids. Calculate detailed reserves reports broken down by areas of interest. Easily create level plots and unfold ramps with plotting tools.

Pair Underground Design with *Underground Ring Design* and *Stope Optimization* for a complete underground skill set. Consider *Script with CSH* or *Introduction to Lava Script* to streamline workflows.

Course Outline
- Rapidly design underground development strings
- Quickly name and calculate reserves for design strings
- Discover how to quickly create triangulation solid representations of development and stopes
- Generate detailed reserves reports for planned stopes
- Create useful level, stope and unfolded ramp plots

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of block models*
- *Familiar with triangulations*

Underground Design – Stratigraphic
Duration: 2 days

Who should take this course: Mining Engineers (Stratigraphic)

Plan and reserve a productive stratigraphic underground mine. Learn how to analyze existing geologic grids to clarify mining decisions. Quickly generate solids of mining blocks. Generate detailed reserves reports and level plots.

Course Outline
- Analyze and contour grids for design layout
- Design freehand headings and cross cuts
- Define and create mining panels
- Generate pillar and roadway blocks for scheduling
- Calculate reserves from geologic models
- Visualize mineable blocks with automatically-generated solids
- Create useful level plots

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of grids*
- *Familiar with triangulations*

Underground Ring Design
Duration: 1 day

Who should take this course: Mining Engineers

Learn how to quickly create, edit and reserve complex ring designs. Easily create ring plots that include drilling and explosives information.

Underground Ring Design tools can also be used to easily create layouts for non-explosive drilling, for purposes such as roof bolting.

Course Outline
- Configure a blast specification with drilling, explosive, and priming information
- Design and edit multiple ring design scenarios
- Quickly and easily calculate reserves for the blast
- Create informative plots of the design, which include drilling and explosives information

Prerequisites
- *Experience with Envisage*
- *Proficient with CAD design*
- *Understanding of block models*
- *Familiar with triangulations*

Unfolding Workshop
Duration: 1 day

Who should take this course: Geologists (Stratigraphic)

Create LVA Model is a powerful addition to Vulcan's unfolding tools used to improve estimations in deposits with express locally varying anisotropy. Apply demonstrated tips and tricks to create undulating surfaces, which Vulcan uses for advanced sample selection when estimating block models. Learn to effectively apply several unfolding methods to quickly and accurately estimate blocks in a folded deposit.

Bring your data to apply unfolding skills mastered in the morning to create block model estimations in the afternoon. A Vulcan expert is available for guidance and to brainstorm time-saving techniques.

Pair with *Block Modelling for Geologists* to develop robust modelling knowledge.

Course Outline:
- Discover tips and tricks for modelling undulating triangulation surfaces
- Effectively apply existing unfolding tools to a deposit
- Learn to use the new Create LVA Model tool effectively
- Create estimations for your block model with help from a Vulcan expert

Prerequisites:
- *Experience with Envisage*
- *Understanding of block models and grade estimation*
- *Familiar with triangulations*

Vulcan Gantt Scheduler
Duration: 2 days

Who should take this course: Underground Mining Engineers and Schedulers

Vulcan Gantt Scheduler is a new activity-based scheduling tool, which integrates mine design and scheduling. Build your schedule seamlessly from Envisage data. Define dependencies interactively, or configure Vulcan to automate the process. Create a schedule animation that reflects changes instantly. Learn how to generate and export summary reports.

Course Outline
- Interactively link the schedule to an existing mine design
- Automatically generate spatial dependencies between activities
- View schedule changes instantly in a live animation
- Generate and export summary reports

Prerequisites
- *Experience with Envisage*
- *Familiar with general scheduling procedures*
- *Understanding of underground mine operations*

Vulcan Refresher
Duration: 1 day

Who should take this course: Geologists, Mining Engineers, Supervisors and Surveyors

Each refresher course is customized to the needs of the participant(s). Take this course if you have been away from Vulcan for a while, or if you would like to discover available functionality in newer Vulcan versions.

Course Outline
- Discover new functionality
- Remember familiar Vulcan tools

Prerequisites
- *Past Vulcan experience*

Evolution Course

Evolution Workshop

Duration: 2 days

Who should take this course: Open Pit Mining Engineers and Schedulers

This workshop provides a comprehensive overview of the Maptek Evolution open pit mine planning tool. Rapidly assess many complex scenarios to maximize value by balancing tonnage, grade, economic and physical constraints. Generate and view long term and short term schedules in an interactive 3D environment. Optimize haulage routes for maximum profit.

Course Outline
- Understand Evolution interface and functionality
- Analyze multiple mine planning example scenarios
- Create dynamic long term and short term schedules quickly
- View schedule progress interactively in a 3D environment
- Optimize haulage routes

Prerequisites
- *Familiar with general scheduling procedures*
- *Understanding of open pit mine operations*

I-Site™ Courses

Advanced Processing and Volumetrics - Open Pit
Duration: 1 day

Who should take this course: Surveyors, Geologists, Geological Engineers and Geotechnical Engineers

Apply basic I-Site knowledge to easily analyze scanned structures. Learn tips for advanced use such as modelling overhanging structures or updating pit surfaces with new scan data. Apply a photograph to scanned data for quick identification of geology or geologic structures. Quickly generate and export toe and crest strings from a pit topography model. This course requires *Introduction to I-Site Studio* or prior I-Site Studio experience*.*

Course Outline
- Discover tips for reflecting shovel cuts in pit updates
- Query and track volumetrics, such as changes to stockpiles or muck piles
- Quickly compare asbulits to the original mine design
- Easily generate toe and crest strings from existing models
- Accurately model overhanging structures
- Apply a high-resolution photograph to scanned data

Prerequisites
- *Completed Introduction to I-Site Studio course*
- *Familiar with I-Site Studio interface*
- *Able to import and register scanned data*

Advanced Processing and Volumetrics - Underground
Duration: 1 day

Who should take this course: Surveyors, Geologists, Geological Engineers and Geotechnical Engineers

Apply basic I-Site knowledge to easily analyze scanned structures. Learn tips for advanced use such as modelling overhanging structures or updating drives with new scan data. Apply a photograph to scanned data for quick identification of geology, geologic structures or infrastructure. This course requires *Introduction to I-Site Studio* or prior I-Site Studio experience.

Course Outline
- Discover tips for updating drives with new scans
- Query and track volumetrics, such as changes to stopes or drives
- Easily compare asbulits to the original mine design
- Accurately model overhanging structures
- Apply a high-resolution photograph to scanned data

Prerequisites
- *Completed Introduction to I-Site Studio course*
- *Familiar with I-Site Studio interface*
- *Able to import and register scanned data*

Build Your Own Course
Duration: varies

Who should take this course: Geologists, Surveyors, Supervisors

Create a course to meet the needs of your operation. Some ideas are listed below, but the list is not comprehensive. Contact your local Maptek office to schedule your unique class.

Course Ideas
- I-Site for geotechnical evaluation.
- Streamlined workflow training
- Blend I-Site with Vulcan training courses for survey positions
- Combine existing courses with custom durations

Prerequisites
- *Varies*

Introduction to I-Site Studio
Duration: 1 day

Who should take this course: Surveyors, Geologists, Geological Engineers and Geotechnical Engineers

Receive an overview of I-Site Studio software in this introductory course. Learn how to install the software and configure licenses. Process and filter field data to construct accurate triangulation models. Export data for use in other software packages. For robust surveying skills, *add Advanced Processing and Volumetrics - Underground* or *Advanced Processing and Volumetrics - Open Pit*. For geotechnical applications, add *I-Site for Geological and Geotechnical Applications*.

Course Outline
- Learn how to install I-Site and configure licenses
- Process and register field data
- Filter obstructions such as trucks, dust or snow
- Create triangulation models from scanned points
- Export data for use in other software packages

Prerequisites
- *None*

I-Site Field Scanning
Duration: 1 day

Who should take this course: Surveyors, Geologists, Geological Engineers and Geotechnical Engineers

Create comprehensive, accurate scans of your site with tips from I-Site experts. Review best practices for capturing survey points. Learn tips for effective data collection with your I-Site scanner. Understand how to care for and maintain an I-Site scanner for long life and peak performance. Learn to process scanned data in *Introduction to I-Site Studio*. For robust surveying skills, also add *Advanced Processing and Volumetrics - Underground* or *Advanced Processing and Volumetrics - Open Pit*.

Course Outline
- Receive a basic review of fundamental survey concepts
- Explore I-Site scanner hardware and specifications
- Discover tips for effective data collection
- Learn best practices for scanner care and maintenance

Prerequisites
- *Familiar with I-Site Studio interface*

I-Site for Geological and Geotechnical Applications
Duration: 1 day

Who should take this course: Geologists, Geological Engineers and Geotechnical Engineers

Discover how I-Site tools can be used to quickly and accurately map geologic features and analyze geotechnical information. Map geologic contacts and structures from three-dimensional, high-resolution photographs applied directly to triangulation models. Quickly obtain strike and dip information on a specific area of interest. Easily identify and display discontinuity sets. Determine failure locations and display failure planes in three-dimensions alongside scanned data. Track surface movement from several periodic scans. This course requires *Introduction to I-Site Studio* or prior I-Site Studio experience.

Course Outline
- Map geologic contacts directly on imported photographs
- Obtain strike and dip information
- Analyze failure locations with stereonets
- Discover structural trends with rose diagrams
- Quickly analyze discontinuity sets alongside scanned data
- Track surface movement over time from periodic scans
- Visualize real-world failure locations with generated planes

Prerequisites
- *Completed Introduction to I-Site Studio course*
- *Familiar with I-Site studio interface*
- *Ability to read and interpret stereonets and rose diagrams*

For more information, email info@maptek.com or call +1 303-763-4919