Curve Fit Installation:

1) Unzip Curve Fit.zip
2) Close all instances of ArcMap 10.x
3) Run Curve Fit.msi, install Curve Fit to a local drive
4) Start ArcMap 10.x
5) Click on the Customize menu and then the Customize Mode... menu item
6) On the Customize dialog, click the Commands tab
7) Scroll down and click on Fox Tools in the Categories list
8) Drag the Curve Fit button to a toolbar on the ArcMap 10.x interface

Curve Fit Use:

1) Open an ArcMap 10.x project that contains a series of input raster datasets.
2) Click the Curve Fit button (see above: Curve Fit Installation)
3) A dialog containing 5 tabs will open (tab headings: Input, Function, Nonlinear Optimization, Output, and Settings Summary).
4) Input tab
   a. With the Input tab active, click on the Add Raster Layer dropdown list and select a raster layer to be added to Curve Fit. Once the layer is selected, click the + button to add the layer to the table of input layers. The title of the layer will appear under the Y Values column. Repeat this process until all of the layers from the data series are added to the table. As an alternative, you can use the + All button to add all of the raster layers in the active data frame. If you added a layer twice or inadvertently included a layer you wish to omit, pressing the Delete key will remove the active row from the table.
   b. Once the raster layers have been added, enter the numeric X Values for each input layer.
5) Function tab
   a. Select an appropriate function to be modeled (available functions: Exponential, Four Parameter Logistic, Linear, Polynomial, and Power)
   b. If the Polynomial function is selected, enter the desired degree of polynomial in the textbox (degree > 1).
6) Nonlinear Optimization tab
   a. These settings are optional and are available when using a nonlinear function (Exponential, Four Parameter Logistic, or Power)
   b. Lower Bound, Upper Bound, and Initial Value for each function parameter can be set in the Parameter Constraints and Initial Values table. Use identical values for the Lower Bound and Upper Bound to constrain a parameter at a constant value.
   c. The Min and Max number of iterations define the range of iterations used in the solution.
   d. Solution tolerances and convergence criteria can be set to specific values for nonlinear functions.
i. **Absolute Tolerance** is the absolute value of the difference between the modeled result and the actual value. The **Absolute Tolerance** specifies the largest value allowed.

ii. The **Relative Tolerance** is the ratio of the absolute value of the difference between the modeled result and the actual value. The **Relative Tolerance** specifies the largest value of the ratio that is allowed.

e. The **Convergence Criteria** specifies the criteria used for the algorithm to exit its iterative analysis (Convergence Criteria options include: **Absolute Tolerance**, **Relative Tolerance**, or **Either Tolerance**).

f. The **Require Convergence** checkbox
   
i. If **Require Convergence** is checked and the **Convergence Criteria** is not met before Curve Fit runs out of iterations, then Curve Fit will output the **No Data** for that pixel.
   
ii. If **Require Convergence** is unchecked and the **Convergence Criteria** is not met before Curve Fit runs out of iterations, then Curve Fit will output the current value for the solution at the time the iterations ran out.

7) **Output** tab

a. The **Directory** textbox identifies the output location for analytical results.

b. The desired **Raster Products** section of the **Output** tab contains all of the output options for Curve Fit. It is advisable to be frugal when selecting output products. There is a direct linear relationship to the length of processing time and number of products selected. All raster products are output as IMG files.

c. The **Output Product Precision** choices are **Single Precision** or **Double Precision**. There is an exponential relationship in the amount of hard disk space required when selecting between **Single Precision** and **Double Precision** output products.

d. The **No Data Value** textbox allows the user to specify a specific no data value (must be an integer value). The default **No Data Value** is -999,999,999.

e. At least 1 raster product must be selected, **Raster Products** include:
   
i. **Adjusted R^2**, **Akaike Information Criterion**, **Bayesian Information Criterion**, **Coefficient of Variation** (available for linear models), **F Statistic**, **Log-likelihood**, **P Value**, **R^2**, **Residual Sum of Squares**, and **Standard Error**.
   
ii. Parameter estimates (Value) and parameter specific statistics (**Standard Error**, **P Value**, and **T-statistic**) are generated by selecting the appropriate checkbox in the **Parameters** table.
   
iii. Residual error for specific input data points are generated by selecting the appropriate checkbox in the **Residual Errors** table.

8) **Settings Summary** tab

a. Creates a textual summary of inputs, function settings, and output products.

b. Confirms that required settings are met prior to executing analysis.

c. Items in red text need to be addressed before Curve Fit can be executed.

d. A text file containing the complete contents of **Settings Summary** tab is written to the output folder each time Curve Fit is executed.