

# FaultPro

Troubleshooting Management Software



## User's Guide



G11405-DX00XEN

FIRST EDITION, REV. D

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## SECTION 1

# Introduction

This user's guide is designed to provide you with all of the information necessary to install, configure, and begin using the FaultPro Troubleshooting Management software in the shortest amount of time possible. The information provided in this guide is organized into several small, easy-to-understand sections that may be read successively (such as when installing a new fault insertion system), and/or used individually as procedural references later.

The sections making up this user's guide are listed and described in the following table.

SECTION	TITLE	PURPOSE
1	Introduction	To introduce users to the FaultPro Troubleshooting Management Software. This section provides an overview of the software by discussing its three main components, discussing the functions of the software's Student and Instructor Interfaces, and providing definitions of the software's most commonly used terms and concepts.
2	System Requirements	Provides the minimum computer hardware and operating system requirements necessary to run the FaultPro software.
3	Installing the Software	Describes the procedures for installing FaultPro as either a network based or stand-alone fault insertion system.
4	Setting Up Database Communications	Describes how to configure FaultPro's Student and Instructor software to exchange data with the FaultPro database.
5	Setting up a Class	Describes how to create and configure a troubleshooting learning system class. Procedures include: <ul style="list-style-type: none"><li>• Adding Instructors</li><li>• Adding Students</li><li>• Creating Classes</li><li>• Defining grading criteria</li><li>• Importing Fault Templates</li><li>• Editing a template</li></ul>
6	Running a Class	Describes the common, day-to-day procedures associated with running a class using FaultPro fault insertion software.

Figure 1. Section Content

## 1.1

**OVERVIEW**

FaultPro is a computer-based, fault insertion and troubleshooting assessment software package. It consists of a student software package, an instructor software package, and a central database.

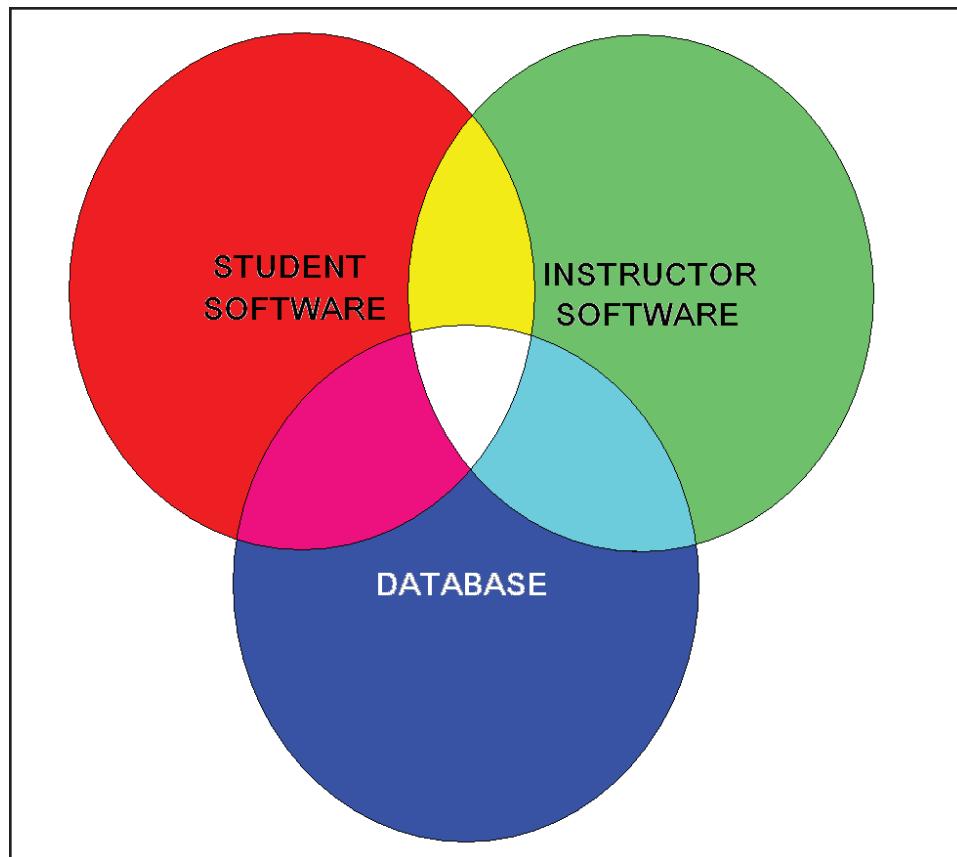


Figure 2. FaultPro Components

## FaultPro Student Software

FaultPro Student software serves the student by acting as a training aid and a troubleshooting test delivery system.

The software serves as a training aid in curriculum-supported procedures in which students use the software to insert faults (one at a time) into the workstation on which they are working. The curriculum then uses the fault as a teaching point, identifying the symptoms that accompany the fault, as well as the troubleshooting procedures used to pinpoint and correctly identify the failed component.

As students develop their troubleshooting skills they are instructed, at strategic points in the curriculum, to use the software's random fault mode to automatically insert faults into their properly operating workstation for identification. Students are given an opportunity to practice their troubleshooting skills in the practice mode, but are also required take a test before successfully completing the assignment. FaultPro student software also permits users to:

- View their troubleshooting class assignments
- Participate in software-delivered practice sessions and tests that review and reinforce previously taught procedures and then assess their troubleshooting competency.

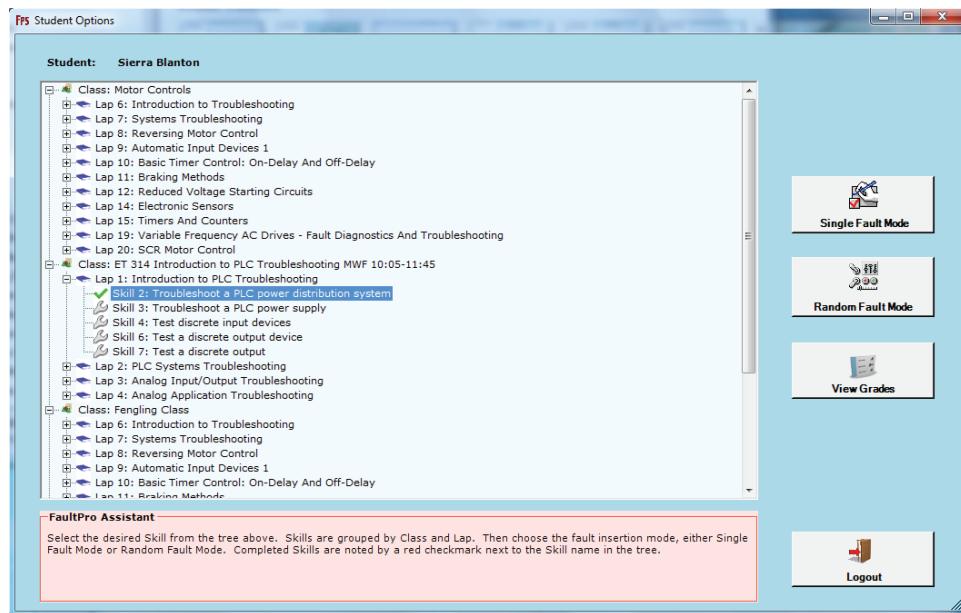


Figure 3. Student Environment/Interface

## FaultPro Instructor Software

FaultPro's instructor software, by contrast, serves the instructor as a student assessment and classroom management tool. It does this by tracking student test results and providing tools that allow instructors to organize and evaluate student-troubleshooting competency as they progress through the curriculum.

Some of the classroom management services provided by FaultPro enable the user to:

- Create classes using pre-defined templates that develop and assess student troubleshooting.
- Create a student database and add or remove students from the above-mentioned classes.
- Use competency-based assessment methods on a class-by-class basis and define criteria/criterion in each case.
- Create and/or edit the faults (fault templates) to be inserted into workstation hardware.
- Evaluate student and/or class progress on a skill-by-skill, LAP-by-LAP, or class-by-class basis.

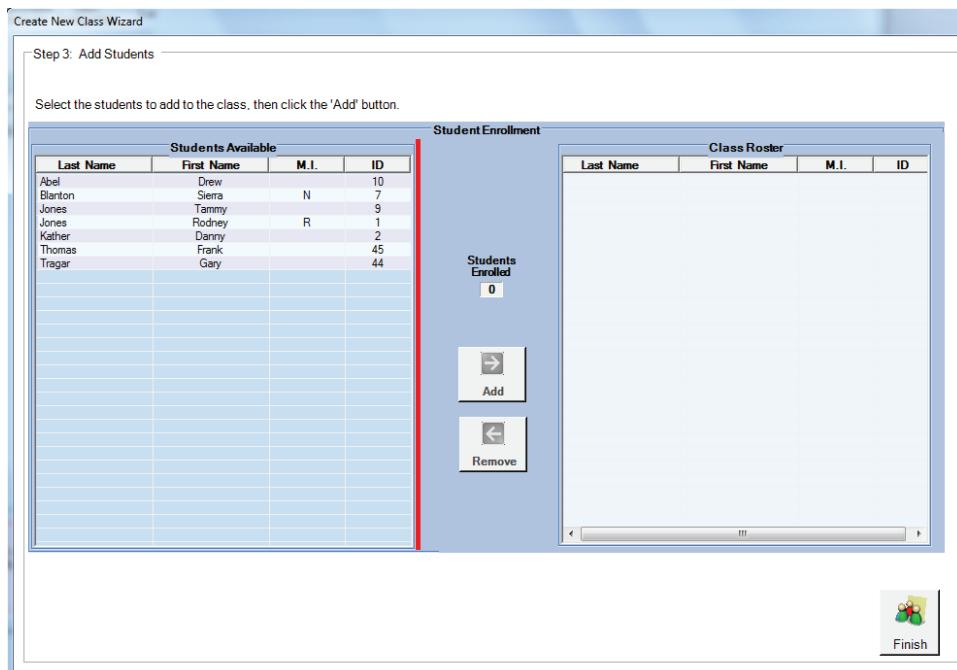


Figure 4. Instructor Software, Adding Students to a Class

## FaultPro Database

FaultPro's database acts as a central storage location; sending, receiving and exchanging information with any student and/or instructor station configured to do so.

Stations are configured to exchange data with the database by identifying the computer (either by Computer Name or IP address) on which the database is stored. This applies to both local and networked installations of FaultPro.

Some of the information stored in the FaultPro database includes:

- Fault templates
- Grading rubrics
- Student databases
- Class rosters
- Student test results

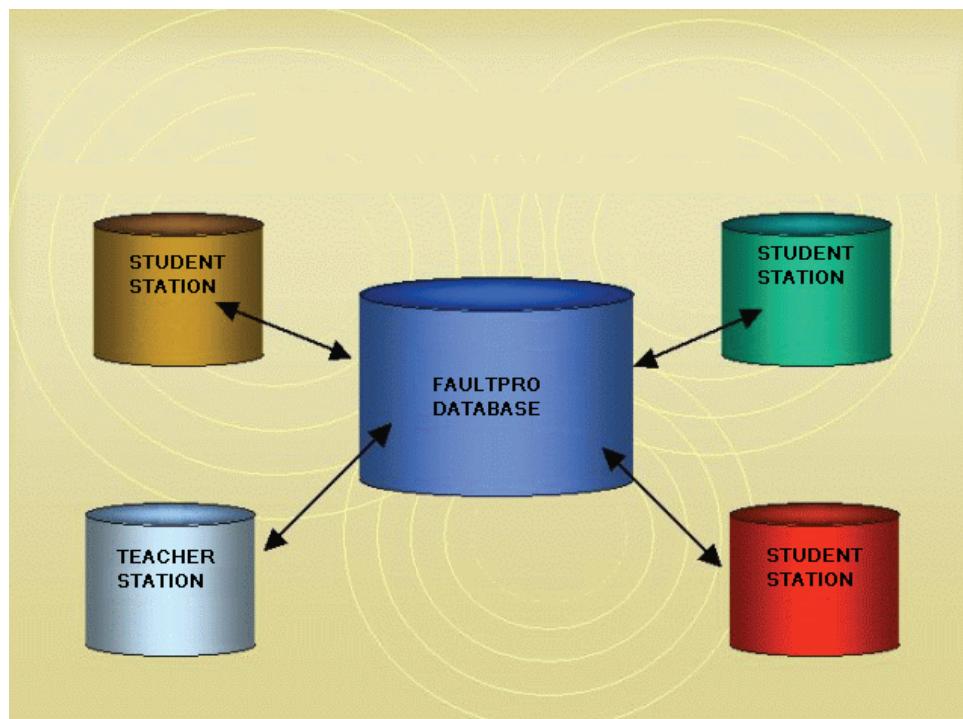


Figure 5. Database Concept

## 1.2

## DEFINITION OF TERMS

Some of the terms used with FaultPro software and fault insertion hardware may seem unfamiliar to new users, but are critical in the understanding and use of the fault insertion system. This section defines some of the more commonly used terms.

**Faults**

Faults, in the FaultPro vernacular, are electronically controlled circuits that reside in the hardware of Amatrol's troubleshooting workstations. Left inactive, the circuits allow the workstation to operate normally, providing no indication that they even exist.

Using FaultPro software, however, enables Amatrol/instructor-developed fault masks to activate the fault circuits inserting "failures" into the workstation and preventing it from operating properly.

In FaultPro, Faults are represented as a row in a fault table. The fault table is displayed when the hardware containing the fault is selected from the template tree directory. Faults are enabled and disabled by selecting or deselecting its Active checkbox in the fault table.

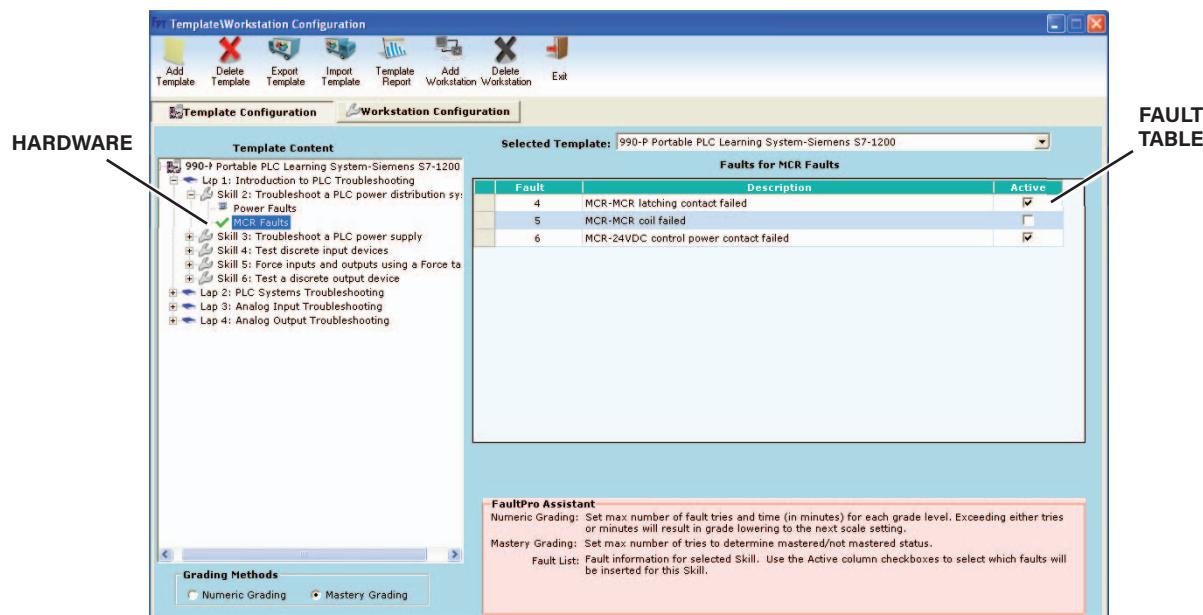


Figure 6. Hardware Selected, Displaying Its Fault Table

## Hardware

Hardware refers to a learning system's workstation and its associated components and/or subsystems.

In FaultPro, hardware serve as organizational objects by storing and identifying all of the faults that may be inserted into that piece of hardware. Figure 6, shows an example where a user has selected the MCR object in a project tree. As a result, the software displays the three faults that may be inserted into the workstation's MCR. Also notice that only faults 4 and 6 are active (selected).

## Fault Mask

A fault mask is a set of faults to be inserted into the workstation as students perform a specific troubleshooting skill. The faults are inserted one at a time to provide students the ability to develop their skills by allowing them to troubleshoot and identify the inserted fault. Fault masks are also used as part of FaultPro's classroom management features by enabling instructors to assess a student's troubleshooting abilities.

In FaultPro, Skill objects function as fault masks. They do this by storing hardware objects and their active (and inactive) faults, while their title identifies when the fault mask is to be applied.

Figure 7, for example, shows the fault mask for LAP 1, Skill 2: Troubleshoot a PLC power distribution system. The mask contains Power and MCR Faults.

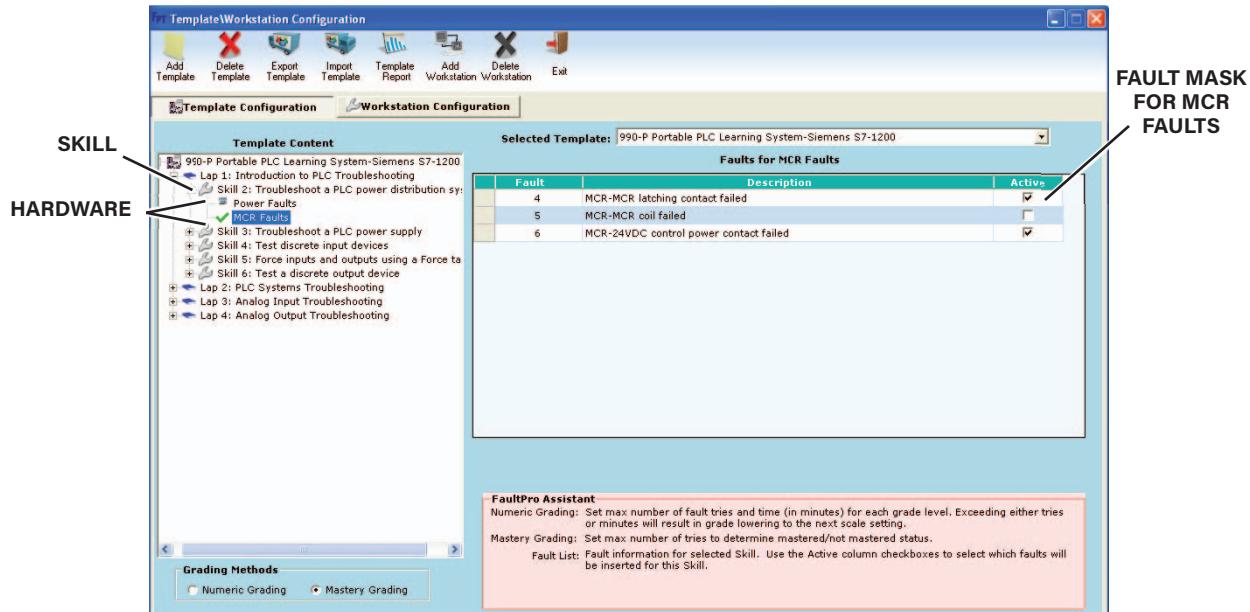


Figure 7. Fault Mask (Skill Object)

## Templates

A template is a collection of fault masks that support the curriculum of a particular Amatrol learning system. The B40080-AA template, for example, supports the B40080-AA curriculum of the 990-PS712F Portable PLC Learning System for Siemens S7-1200 Controllers. FaultPro Troubleshooting Management Software is shipped with all available templates included. Instructors can modify existing templates if desired. They can also import new templates into FaultPro as they become available. The ability to modify, create, or import templates helps the instructor customize the training as necessary to meet the needs of the students and/or industry.

## SECTION 2

# System Requirements and Parts Inventory

This section covers the basic computer hardware and system requirements necessary to run FaultPro.

2.1

## SYSTEM REQUIREMENTS

The computers on which FaultPro is installed should meet the following minimum requirements.

FAULTPRO MINIMUM SYSTEM REQUIREMENTS		
ITEM	INSTRUCTOR STATION COMPUTER	REMOTE STATION COMPUTER
CPU	1 gigahertz (GHz) or faster 32-bit (x386) or 64-bit (x64) processor	1 gigahertz (GHz) or faster 32-bit (x386) or 64-bit (x64) processor
Memory	4G RAM	4G RAM
Hard Drive Space	500GB	500GB
USB 2.0	Required	Required
DVD-ROM Drive	Required	Required
Operating System	Windows XP/7/10/11	Windows XP/7/10/11
Network Card	Required for networking	Required for networking
Printer	Laser or Ink Jet	* N/A

\* Minimum of one networked printer is expected to be installed at instructor's station.

Figure 8. FaultPro Minimum System Requirements

## 2.2

## PARTS INVENTORY/IDENTIFICATION

Before you install the FaultPro software, you should inventory each component to make sure that all components are present. Amatrol supplies the DVD necessary to install the instructor and remote computer programs, as well as enable network control.

1. Locate the FaultPro installation DVD, as shown in figure 9.



Figure 9. FaultPro Installation DVD

2. Locate the training equipment that will be used with the FaultPro software.

FaultPro is designed to work with Amatrol's troubleshooting-supported workstations such as the 990-PS712F Portable PLC Learning System, the 890-AB5500 PLC Troubleshooting Learning system (with 890-PEC-B Troubleshooting Learning System), and the 85-MT5 Motor Control System (with 890-FTS-1 Fault Troubleshooting System Module).

Along with the software, you should receive the User's Guide, which is the book you are now reading.

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#### NOTE

You should consult the installation manual for your troubleshooting learning system to locate instructions specific to setting up your hardware and connecting a computer to it.

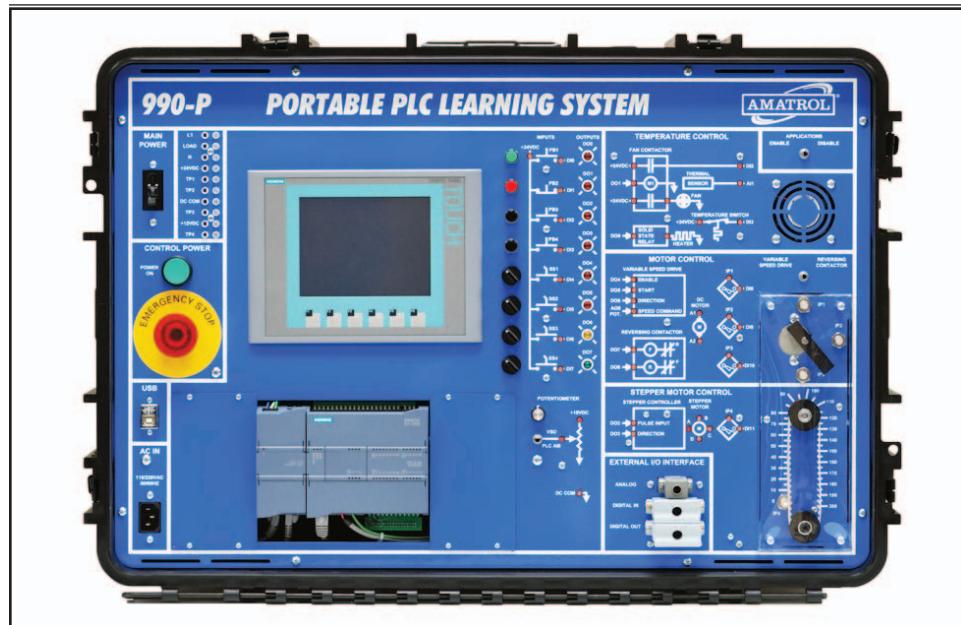


Figure 10. Amatrol Troubleshooting Supported Workstation (990-PS712 Portable PLC Learning System)

## SECTION 3

# FaultPro Installation

### 3.1

### INSTALLATION OVERVIEW

FaultPro may be setup in either a networked or a stand-alone configuration. In the networked configuration, Student software is typically installed at one or more stations having both an Amatrol Troubleshooting Learning System and a networked student computer. The Instructor and Database Software are installed on the Instructor's networked computer.

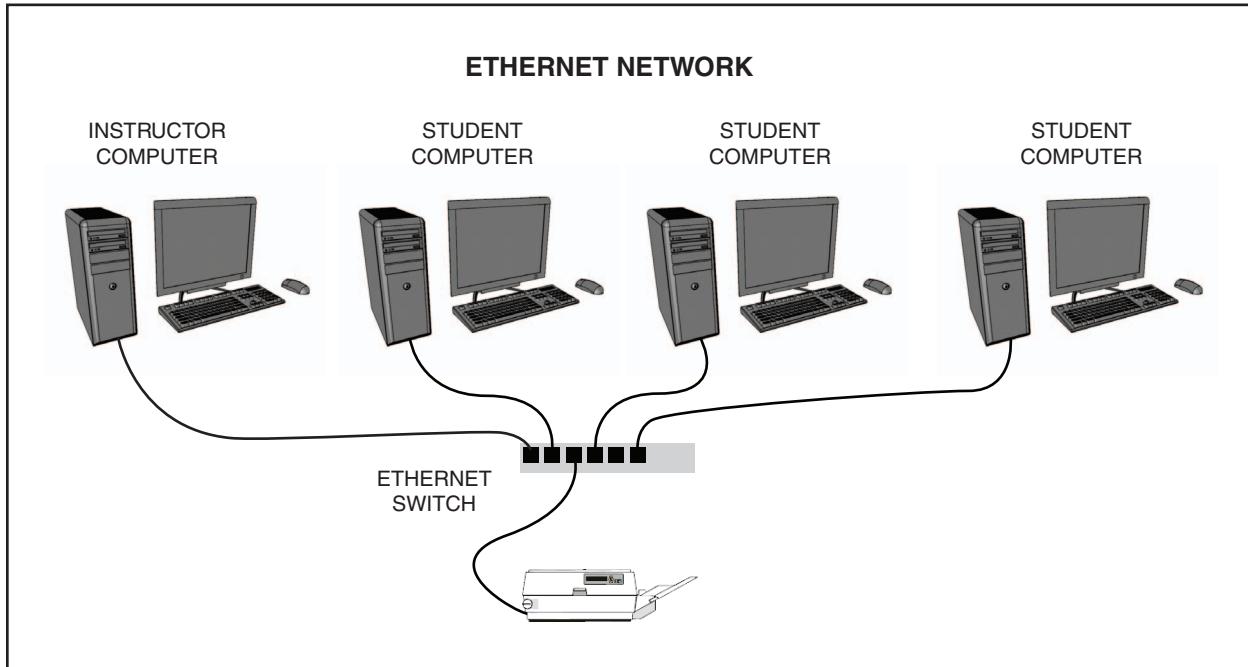


Figure 11. Networked Configuration

Instructions for installing FaultPro on networked computers is provided in section 3.11.

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#### NOTE

You will probably need to consult with your institution's IT administrator to provide you rights necessary to perform these functions.

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### 3.11

### FaultPro Installation for Networked Configurations

1. Identify the computer on which you wish to install the FaultPro Instructor software and support utilities. The computer should be connected, via Ethernet, to the computer(s) that will serve as the student station(s).

2. Power up and log into the instructor station.

You will need to have administrative rights to install FaultPro Instructor software.

3. Insert the FaultPro DVD into the computer's DVD drive.

The FaultPro Install Menu should automatically appear. If not, use Windows Explorer to navigate to the DVD location/drive and click setup.exe.

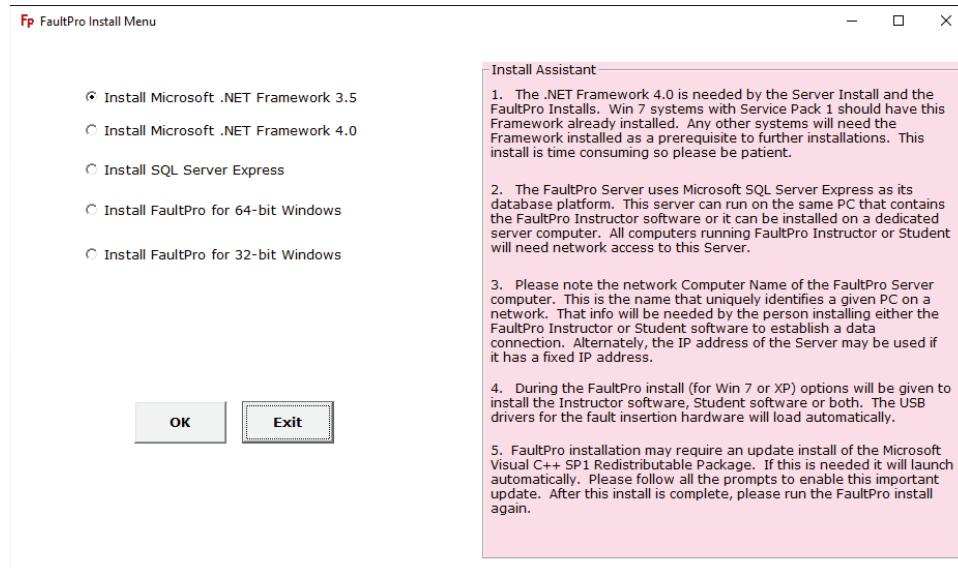


Figure 12. Software Installer

4. Perform the following substeps to install SQL Server. SQL Server is the database software that manages and organizes fault templates, teacher, student, and class information.

- A. Select the **Install SQL Server Express** option and then click **OK**.

Note that if your organization requires special characters in their password requirements that the default password will not meet this requirement. You will need to press and hold the Shift key after clicking OK to get a new dialog window for Custom installation to be able to set the password to your organizations needs.

The installer will evaluate the instructor's station for required software. In some cases, the installer may identify and navigate the user to supplemental software installations and procedures. In others, it will indicate that no other installations are necessary, as shown in figure 13.

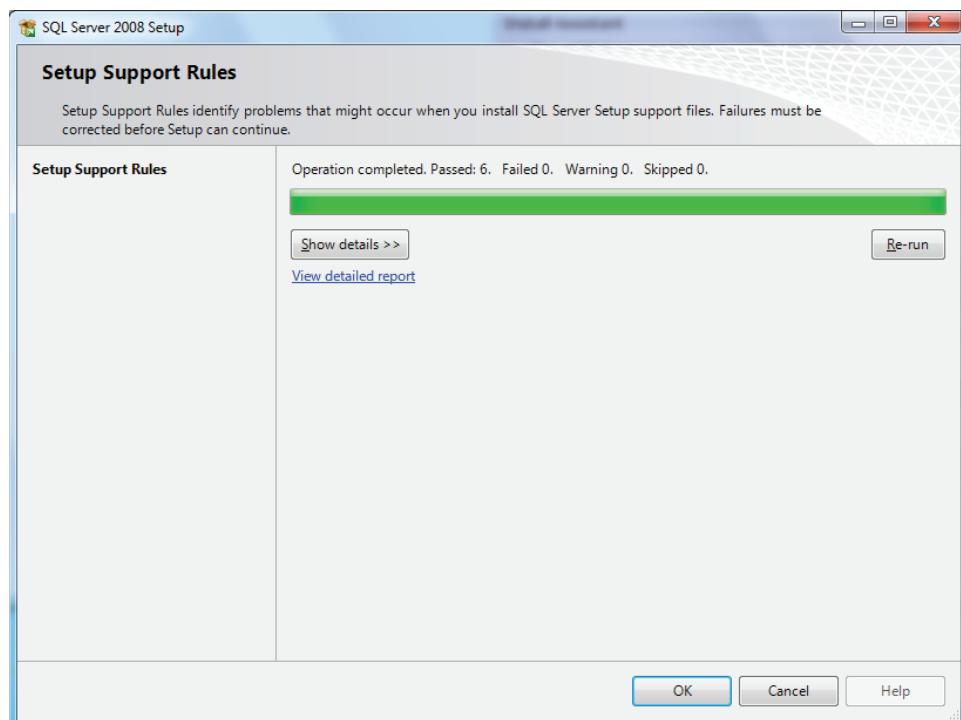


Figure 13. SQL Server Setup

If the install program determines that Microsoft.NET Framework 4.0 needs to be installed, you will be prompted to install it. Follow the prompts to install it.

B. Click **OK**.

SQL Server will begin the installation process, displaying several dialogs in the process. Once complete, the FaultPro Server Install dialog will appear as shown in figure 14.

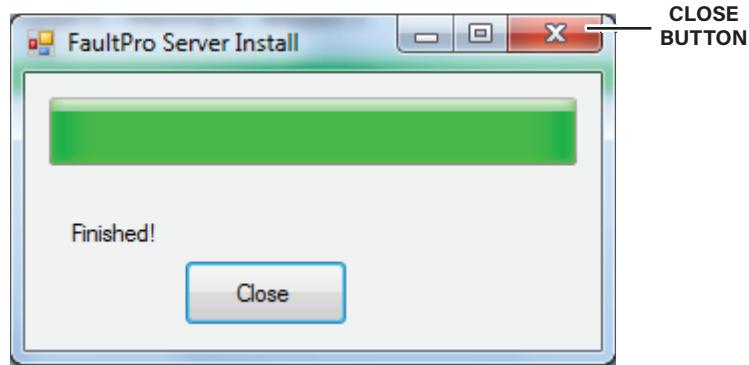


Figure 14. FaultPro Server Install Finished

C. Click the **Close** button to close the FaultPro Server Install dialog.  
The dialog disappears leaving the FaultPro Install Menu.

5. Perform the following substeps to install the FaultPro software. This will install the instructor and student software for FaultPro.
  - A. The Microsoft Visual C++ 2005 Service Pack 1 is required for this software.

Due to changes in Microsoft's software this will not be automatically detected reliably. To install it manually, browse to the FaultPro DVD location/drive using Windows Explorer and click the vcredist\_x86\_update.exe to run this installation.

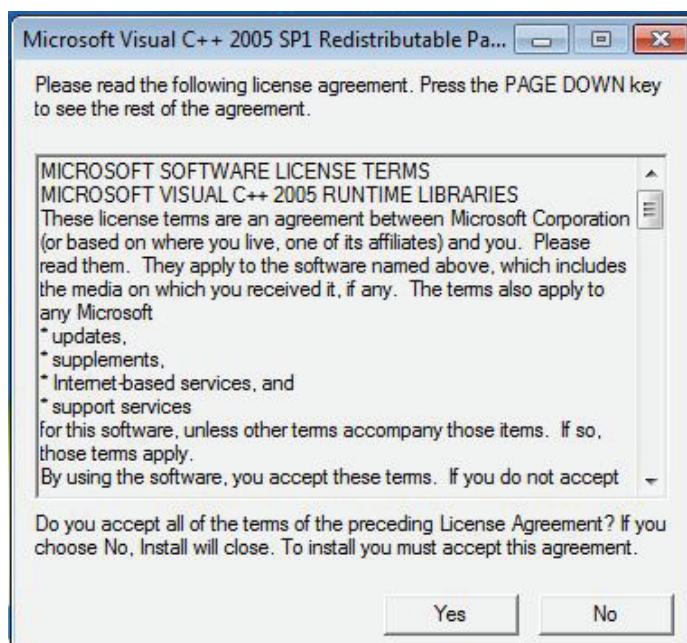


Figure 15. Microsoft Visual C++ 2005 License Screen

- B. The Microsoft .NET Framework 3.5 is required for this software. Select Install Microsoft .NET Framework 3.5 and click OK to install it.

If this fails, then it can be installed manually by going into the Windows's Settings menu and then selecting Apps. Under this section, click on the Optional features text.

In the new window that opens, click the More Windows features selection to bring up the Windows Features dialog screen.

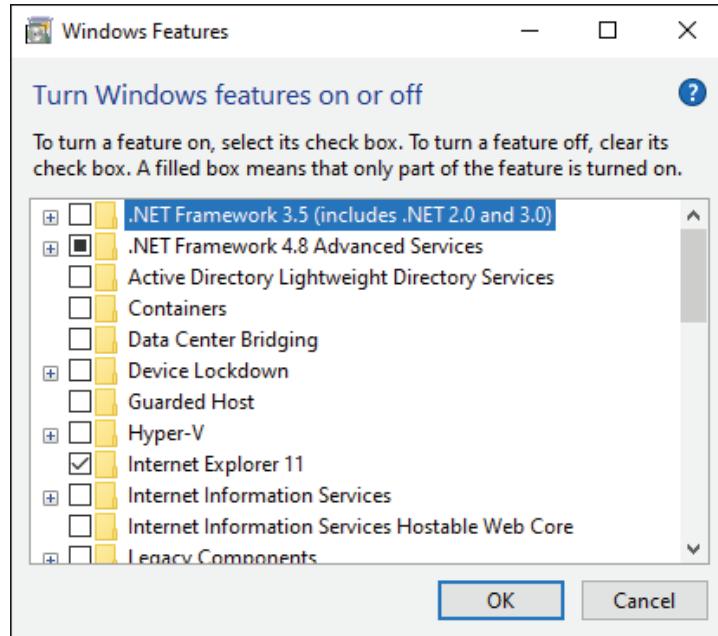


Figure 16. Windows Features

Select .NET Framework 3.5 (includes .NET 2.0 and 3.0) and click OK to install it.

- Click the **Install FaultPro for XX-bit Windows** (where XX represents whether your computer's operating system is 32 or 64 bit) and then click OK.

The FaultPro Setup Wizard should appear on your screen, as shown in figure 17.

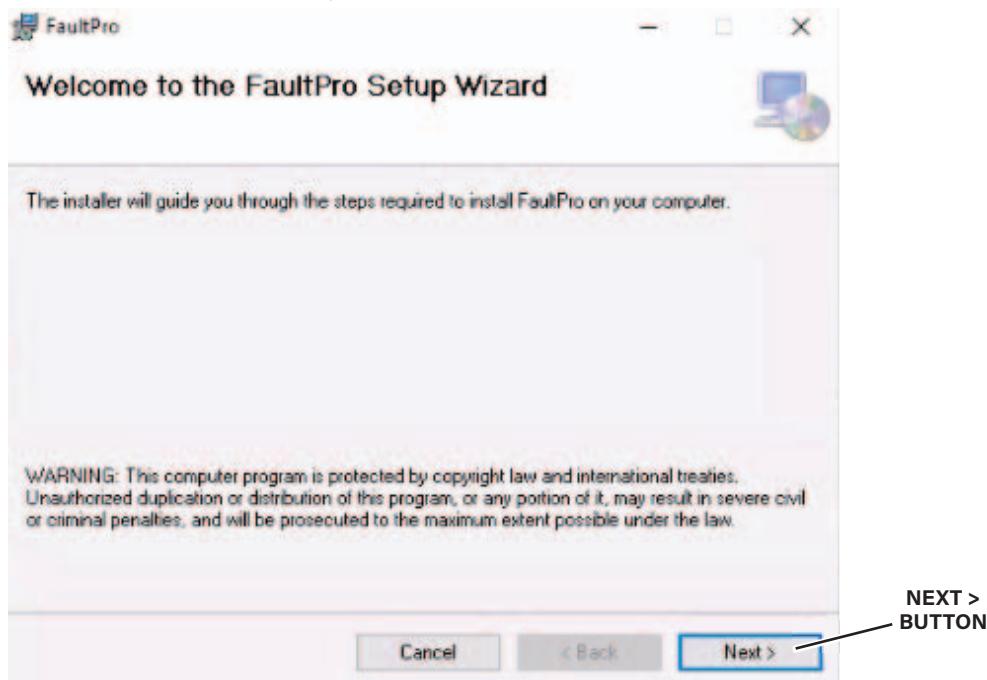


Figure 17. FaultPro Setup Wizard

- D. Click the **Next>** button to advance the wizard.  
The FaultPro License Agreement will appear.
- E. Read the FaultPro License Agreement, and if you accept the terms of the agreement, select the **I Agree** radio button and click **Next>**. Otherwise, you will not be able to install the software.  
The Wizard proceeds to prompt you to select an installation folder. Although the destination folder may be modified, Amatrol suggests the installer use the factory defaults.

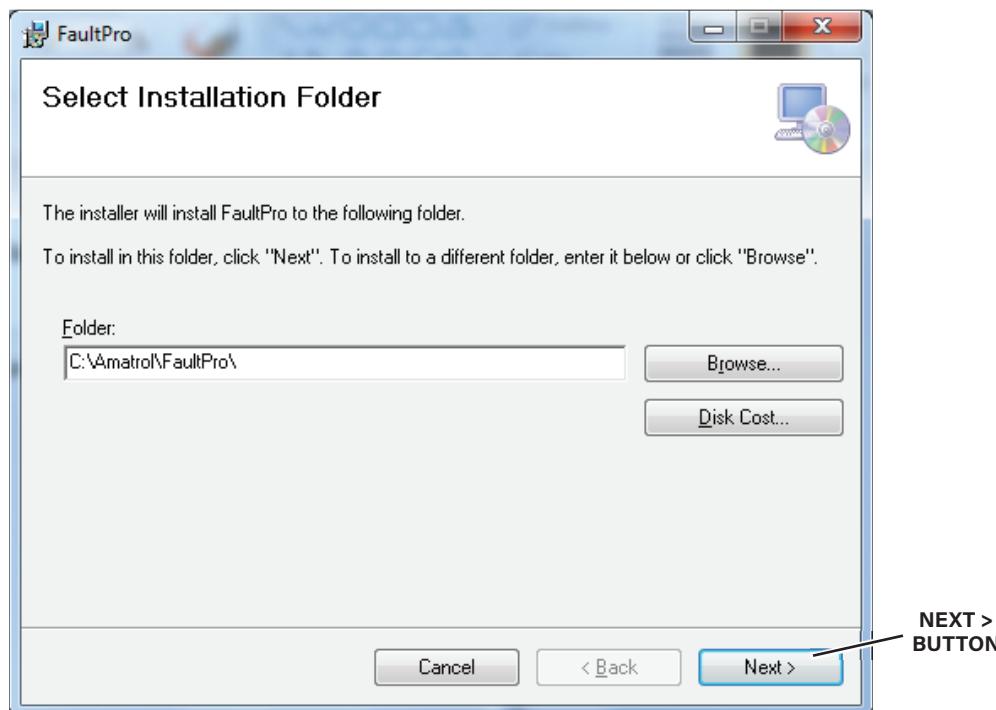


Figure 18. Select Installation Folder

- F. Click **Next>** to begin installing the Instructor software in the defined destination folder.

The software installs (which may take several minutes) and then launches the FaultPro Driver Setup Wizard, shown in figure 19.

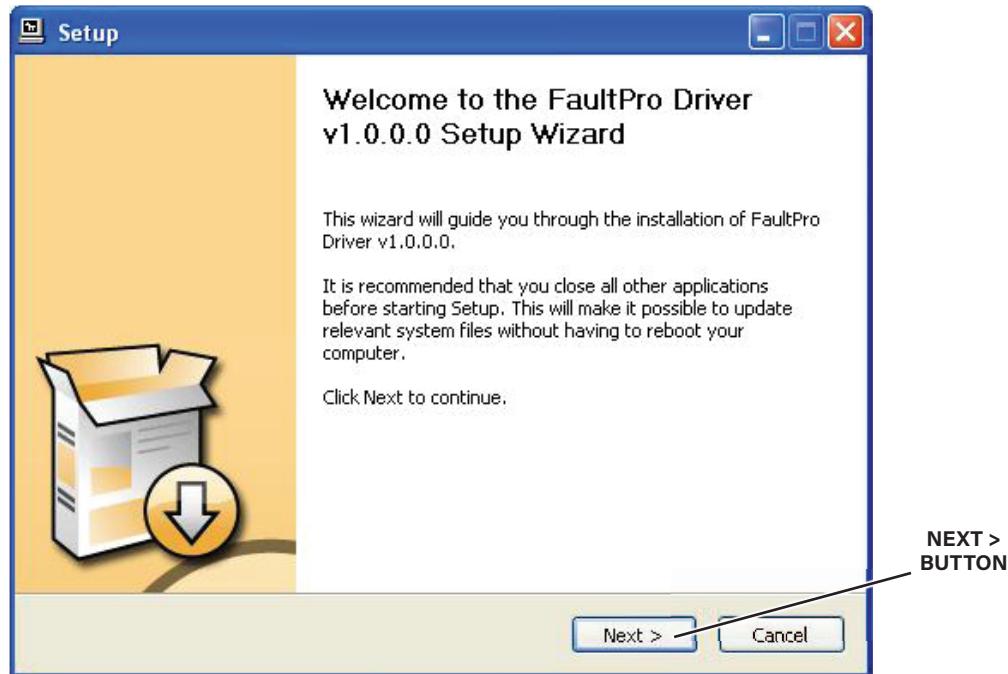


Figure 19. Driver Setup Wizard

- G. Click **Next>** to continue driver installation.  
Another license agreement appears.
- H. Read the License Agreement, and if you accept the terms of the agreement, select the **I accept the terms of the License Agreement** and click **Next>**. Otherwise, you will not be able to install the software.  
The wizard then displays the destination folder in which the USB drivers will be installed.

- I. Click Install to begin installing the drivers into the appointed location.

The drivers are installed in the defined location and the Installation Complete dialog appears, as shown in figure 20.

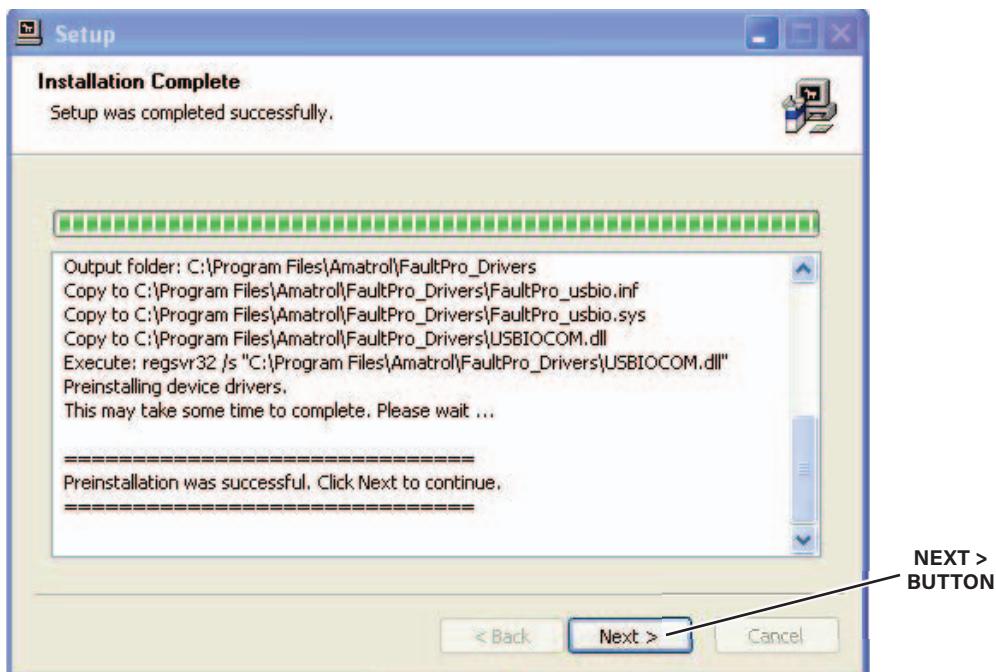


Figure 20. Installation Complete Dialog

- J. Click **Next >** to continue the process.

The Completing the FaultPro Driver Setup Wizard will appear.



Figure 21. Completing the FaultPro Driver Setup Wizard

**K. Click Finish.**

A dialog appears prompting you to disconnect and reconnect your device to complete driver installation.

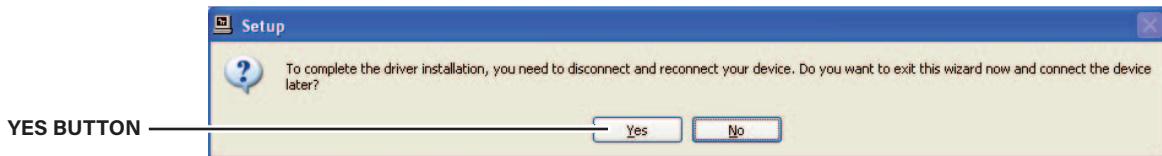


Figure 22. To Complete Driver Installation

**L. Click Yes. Click Finish, and click Close.**

6. If your computer is running Windows XP, perform the following substeps to determine the server name. If your computer is running Windows 7/10/11 instead, continue to step 7 to determine the server name.

The server name is the name of the computer on which FaultPro's Server software (SQL Server) resides and is required to configure both FaultPro's teacher and student software packages in Section 4.

- A. Click Start, Control Panel, and then System to display the System Properties dialog, shown in figure 23.

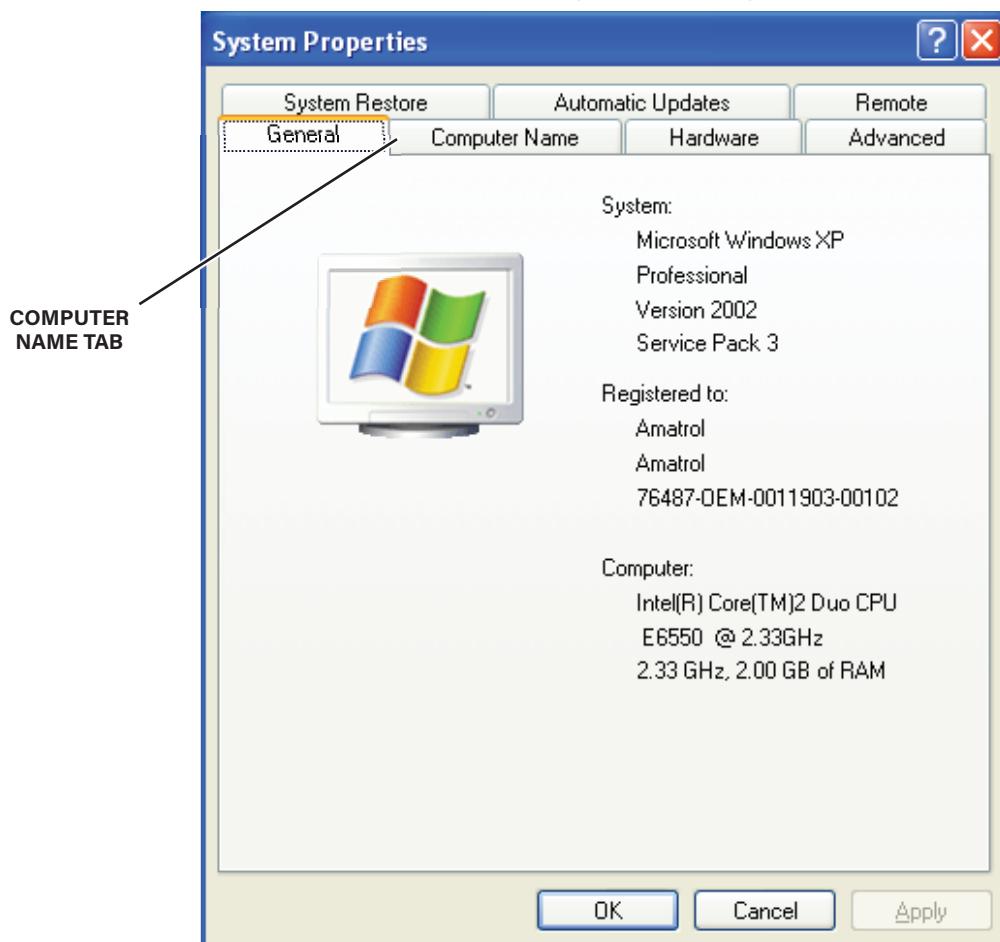


Figure 23. System Properties Dialog

- B. Click the **Computer Name** tab to display its contents.

The Computer Name tab will appear as shown in figure 24.

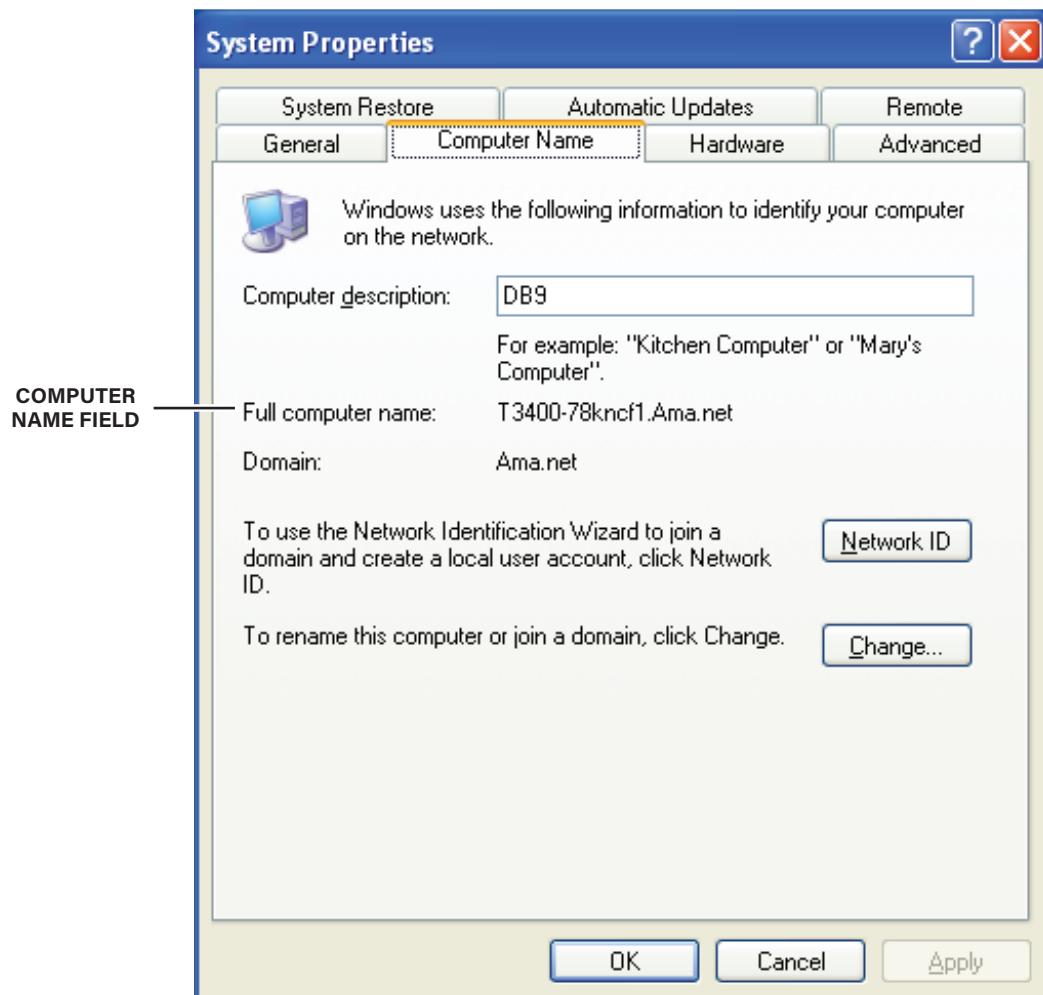


Figure 24. System Properties Dialog, Computer Name Tab

- C. Locate and record the Full Computer name of your computer. Be sure to record your findings exactly as they appear in the dialog. You will use this information later in Section 4.

The location of the computer name is shown in figure 24.

Full Computer name/Server name: \_\_\_\_\_

7. If your computer is running Windows 7/10/11, perform the following substeps to determine the server name.

The server name is the name of the computer on which FaultPro's Server software (SQL Server) resides and is required to configure both FaultPro's teacher and student software packages in Section 4.

- A. Open Windows File Explorer and right-click This PC of the computer, as shown in figure 25, and click the Properties option.

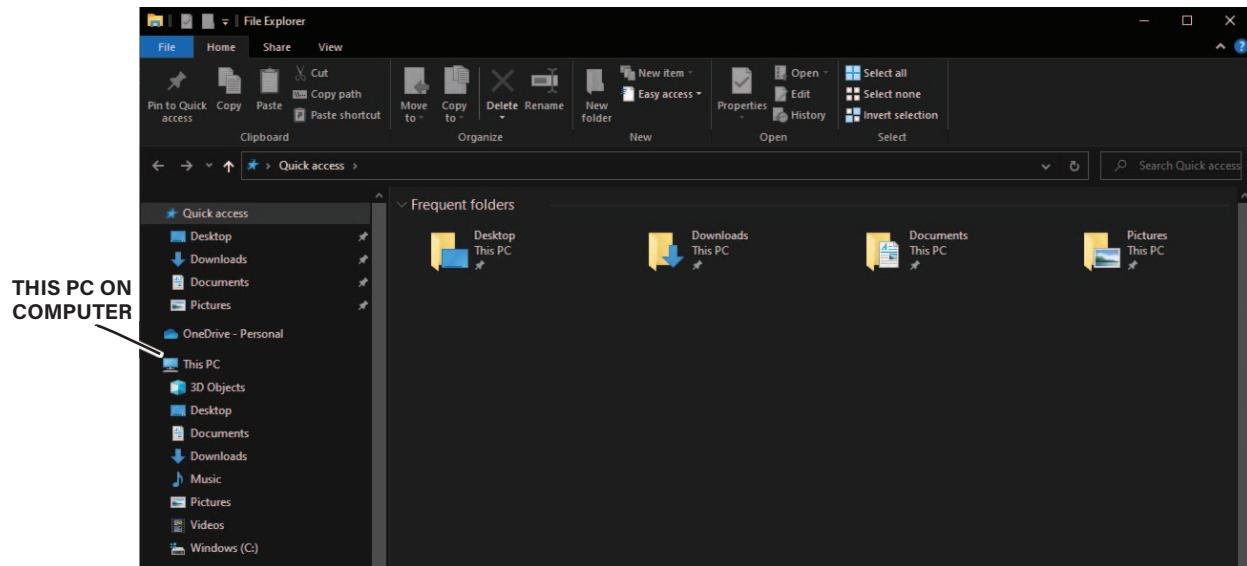


Figure 25. Computer Dialog

The System Properties dialog will appear, as shown in figure 26.

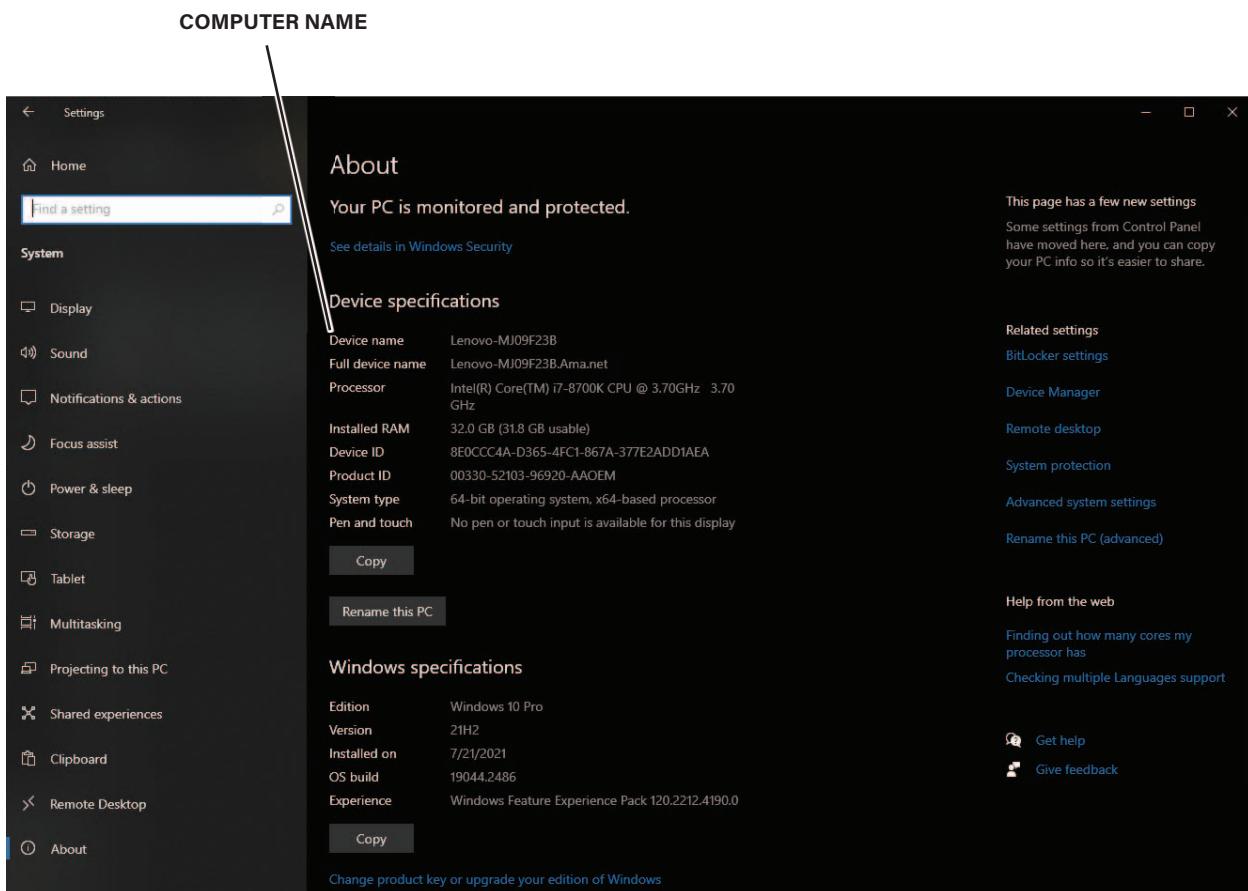


Figure 26. System Properties Dialog

- B. Locate and record the Computer name of your computer. Be sure to record your findings exactly as they appear in the dialog. You will use this information later in Section 4.

The location of the computer name is shown in figure 26.

Computer name/Server name: \_\_\_\_\_

8. Identify the computer(s) on which you wish to install FaultPro Student Software.

Each computer should be connected, via a USB cable, to an Amatrol Troubleshooting workstation. If you only need the student software on the same computer you install previously then skip to Step 11.

9. Power up and log into each student station. You will need to have administrative rights to install FaultPro.
10. Repeat Step 5 for each student station to install the FaultPro software on them.
11. Perform the following steps to install software drivers for the FaultPro hardware.
  - A. Remove and reinstall the USB cable connection between the PC and the workstation.

The Found New Hardware Wizard will appear on your screen indicating that the PC detects the USB hardware.



Figure 27. Found New Hardware Dialog

- B. Click the **Yes, this time only** option and then click **Next>**.

The Wizard will then prompt you to install the software (drivers) for the newly found hardware.

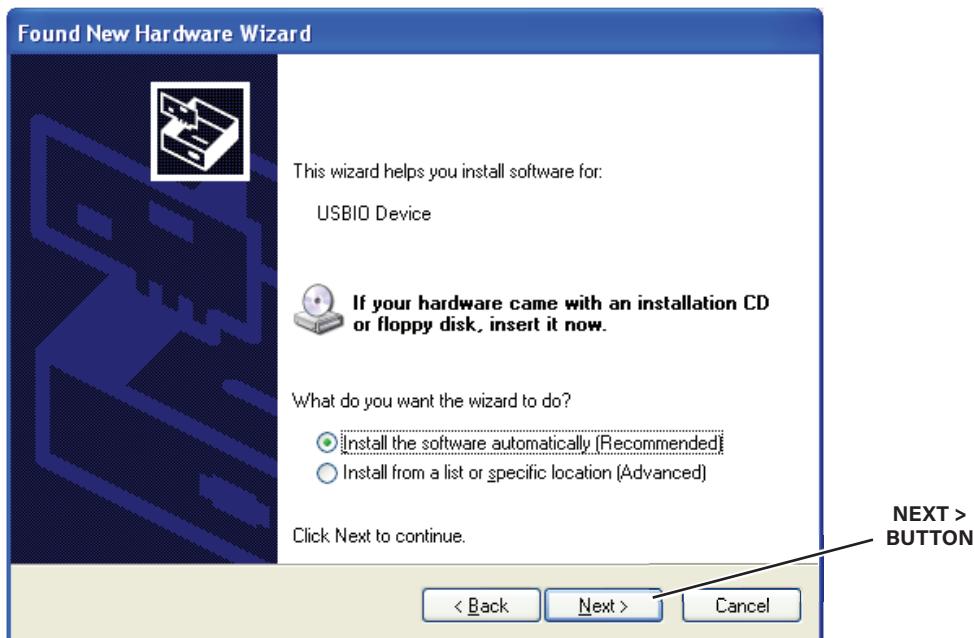


Figure 28. Found New Hardware Dialog Continued

C. Verify that the **Install the software automatically (Recommended)** option is selected and click the **Next >** button.

The Wizard will then begin searching for the recently installed drivers. When complete, the wizard will appear as shown in figure 29.



Figure 29. Found New Hardware Wizard, Completing...

D. Click the **Finish** button.

12. If you are using a server/client setup for FaultPro, then you may need to make sure that the FaultPro on the server is allowed through the firewall on the server for the client machines to be able to connect correctly depending on your organizations network policies.  
This may involve allowing the sqlservr.exe through the firewall, and possibly opening the SQL ports for communication.
13. Open the Services window, by clicking the Start button and searching for services, and then check that the FaultPro SQLServer services are enabled and set to startup automatically.

## SECTION 4

# Setting up Database Communications

This section provides you with the steps necessary to configure the Instructor and Student software packages to communicate with FaultPro's Database server.

This step must be performed regardless of whether the software was installed in the network or stand-alone configuration.

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### NOTE

You will probably need to consult with your institution's IT administrator to provide you rights necessary to perform these functions.

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### 4.1

### INSTRUCTOR SOFTWARE CONFIGURATION

1. Locate and then double-click the **FaultPro\_Instructor** Icon to start the program.

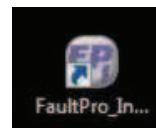


Figure 30. FaultPro\_Instructor Icon

The FaultPro Instructor Login Screen will appear.

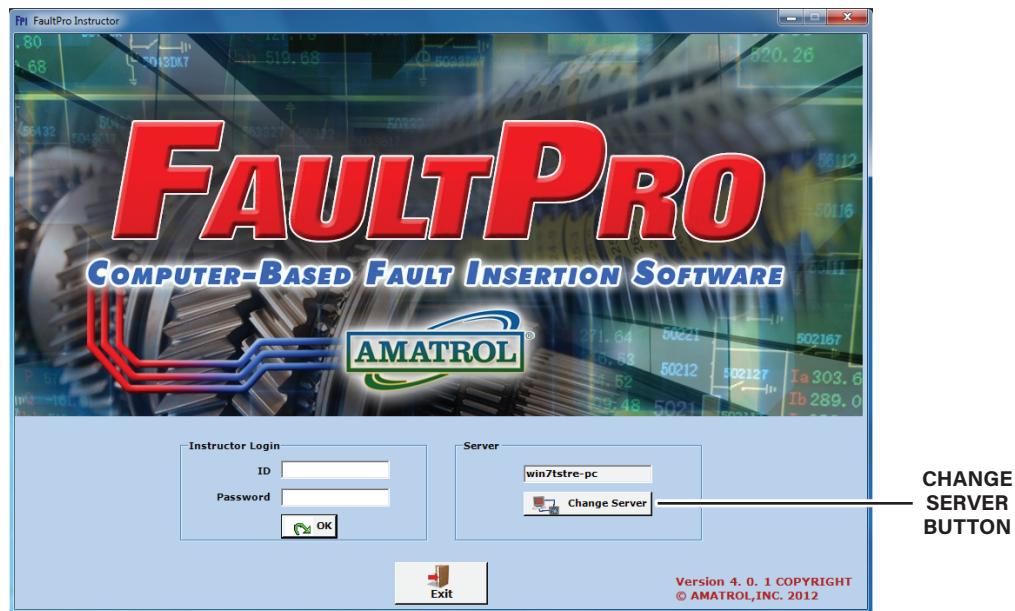


Figure 31. FaultPro Instructor Login Screen

2. Click the **Change Server** button.

A dialog will appear prompting you to enter a password.

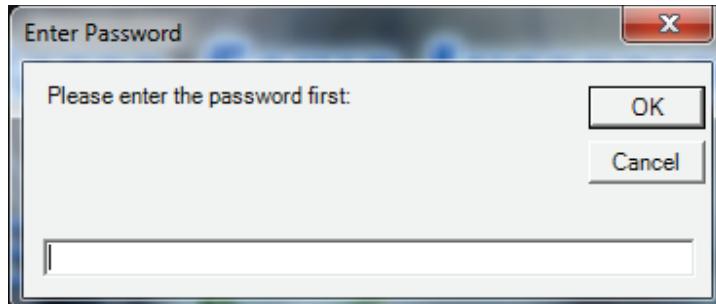


Figure 32. Enter Password Dialog

3. Type **amatrol1638** and then press **Enter**.

The Change Server dialog should appear.

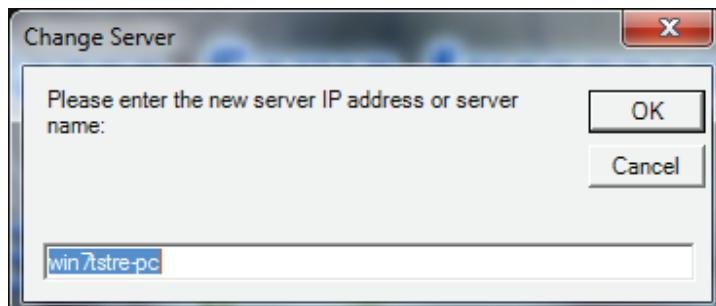


Figure 33. Change Server Dialog

4. Type the name of the Server and then press **Enter**.

The servers is the computer on which you installed the FaultPro Server software and recorded the name earlier (refer to Section 3 if necessary).

A dialog should appear indicating that the connection was successful.



Figure 34. Connection Established

5. Click **OK** to acknowledge and close the dialog.
6. Click the **Exit** button to close the FaultPro Instructor Login Screen.

## 4.2

## STUDENT SOFTWARE CONFIGURATION

1. Locate and then double-click the **FaultPro\_Student** Icon to start the program.



Figure 35. FaultPro\_Student Icon

The FaultPro Student Login Screen will appear.

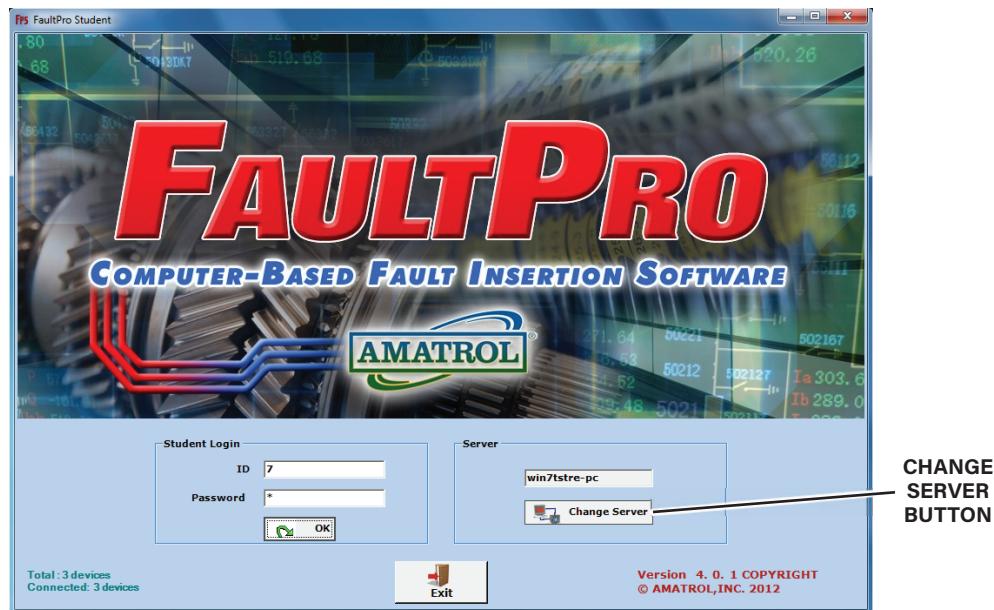


Figure 36. FaultPro Login Student Screen

2. Click the **Change Server** button.

A dialog will appear prompting you to enter a password.

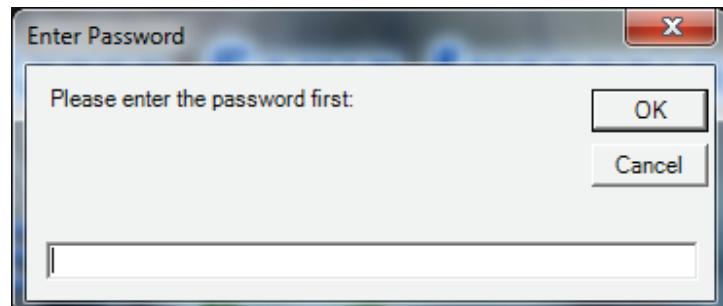


Figure 37. Enter Password Dialog

3. Type **1638amatrol** and then press **Enter**.

The Change Server dialog should appear.

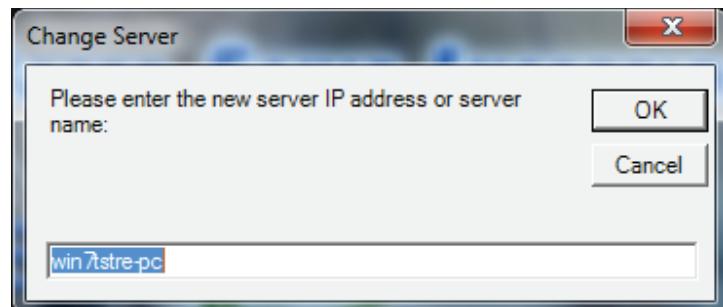


Figure 38. Change Server Dialog

4. Type the name of the server computer and then press **Enter**.  
The servers is the computer on which you installed the FaultPro Server software and recorded the name earlier (refer to Section 3 if necessary).  
A dialog should appear indicating that the connection was successful.

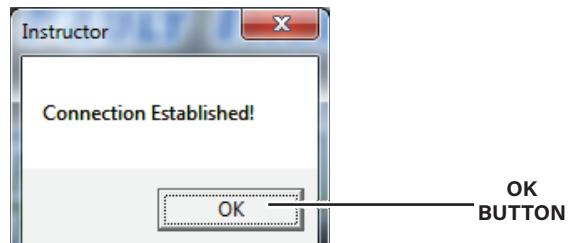


Figure 39. Connection Established

5. Click **OK** to acknowledge and close the dialog.
6. Click the **Exit** button to close the FaultPro Instructor Login Screen.

## SECTION 5

# Setting up a Class

This section contains the instructions necessary to set up a class using the FaultPro software. Once the required setups are completed, you will be able to make use of the computerized fault insertion system in your class.

### 5.1

### ENTER YOURSELF AS AN INSTRUCTOR

1. Perform the following substeps to log into FaultPro using the default instructor Login ID and Password.
  - A. Locate and then double-click the **FaultPro Instructor** program icon, shown in figure 40.



Figure 40. FaultPro Instructor Station Program Icon

The login screen should appear, as shown in figure 41.



Figure 41. FaultPro Instructor Station Login Screen

- B. Click the **Instructor Login ID** field, shown in figure 41.
  - C. Type **1638** in the **Login ID** field and press the **Tab** key.
  - D. Type **amatrol** in the **Password** field and then press the **Enter** key.
- The Instructor Options dialog should appear, as shown in figure 42.

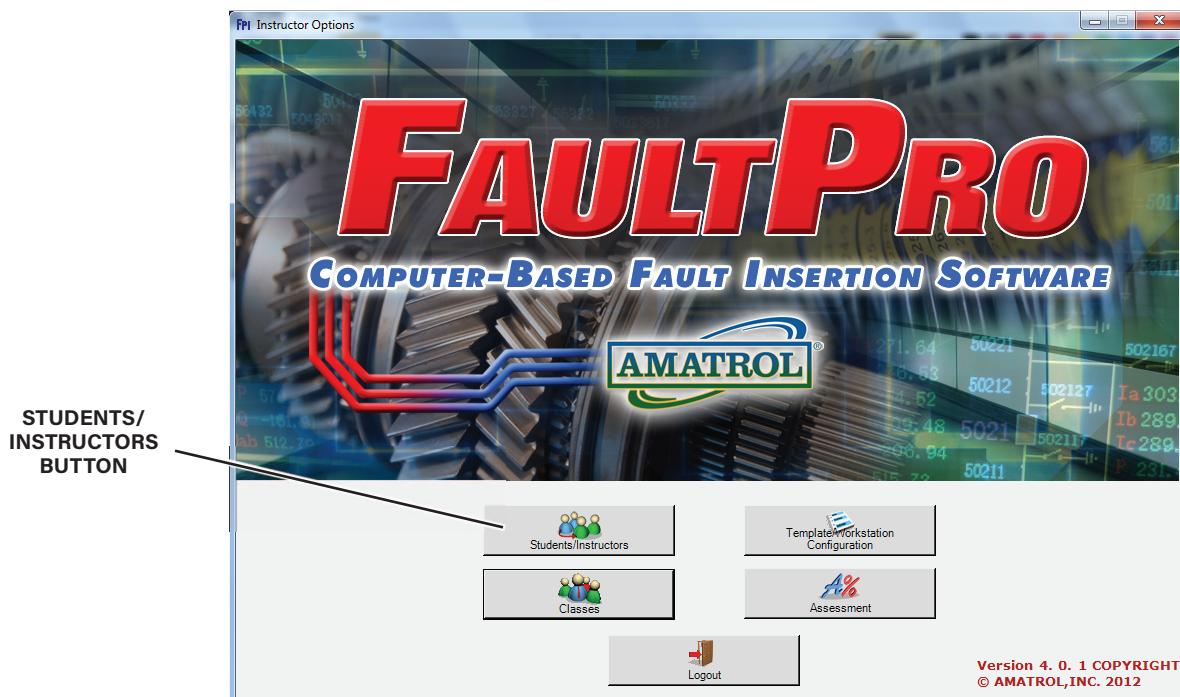


Figure 42. The Instructor Options Dialog

2. Perform the following substeps to add yourself to the Instructor database.

- A. Click the **Students/Instructors** button to open the Student/Instructors dialog, shown in figure 43.

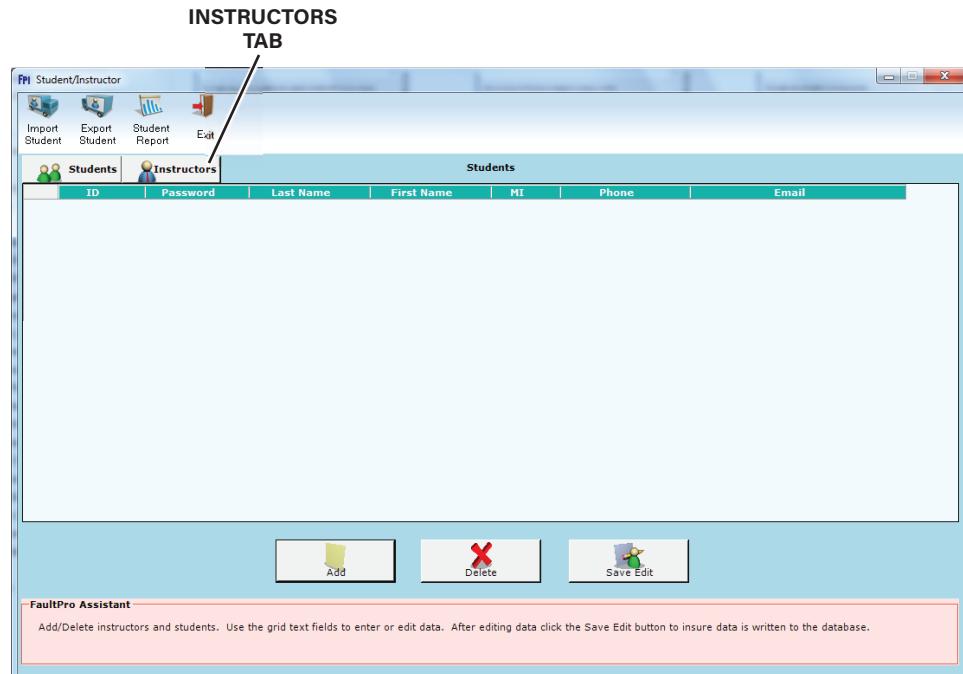


Figure 43. The Edit Instructor Screen

- B. Click the **Instructors** tab to display a listing of instructors. The Instructors tab should appear as shown in figure 44.

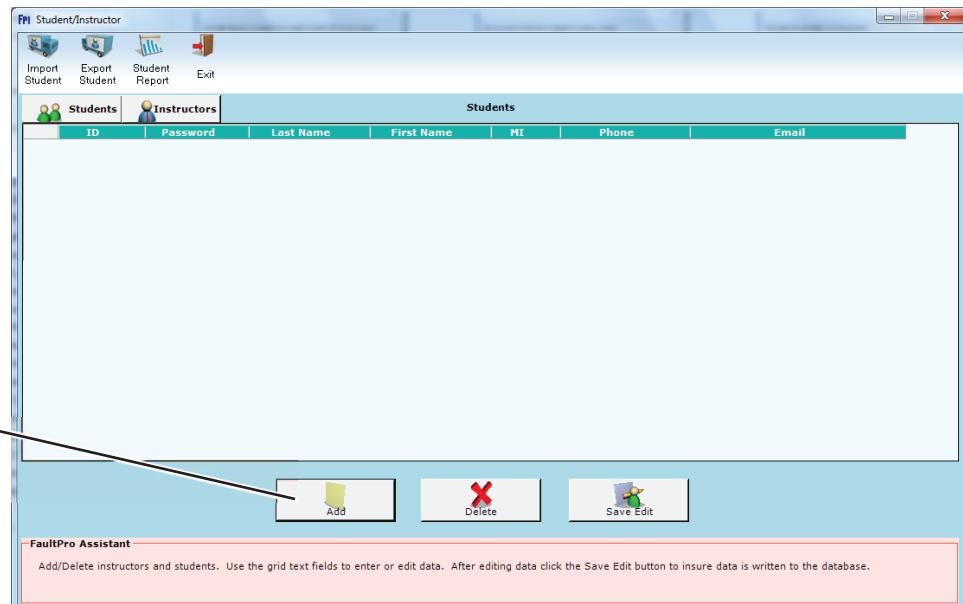


Figure 44. Instructor's Tab Displayed

- C. Click the **Add** button, shown in figure 44, to begin the process of adding an instructor to the database.

A new line appears, prompting you to populate the line with instructor data.

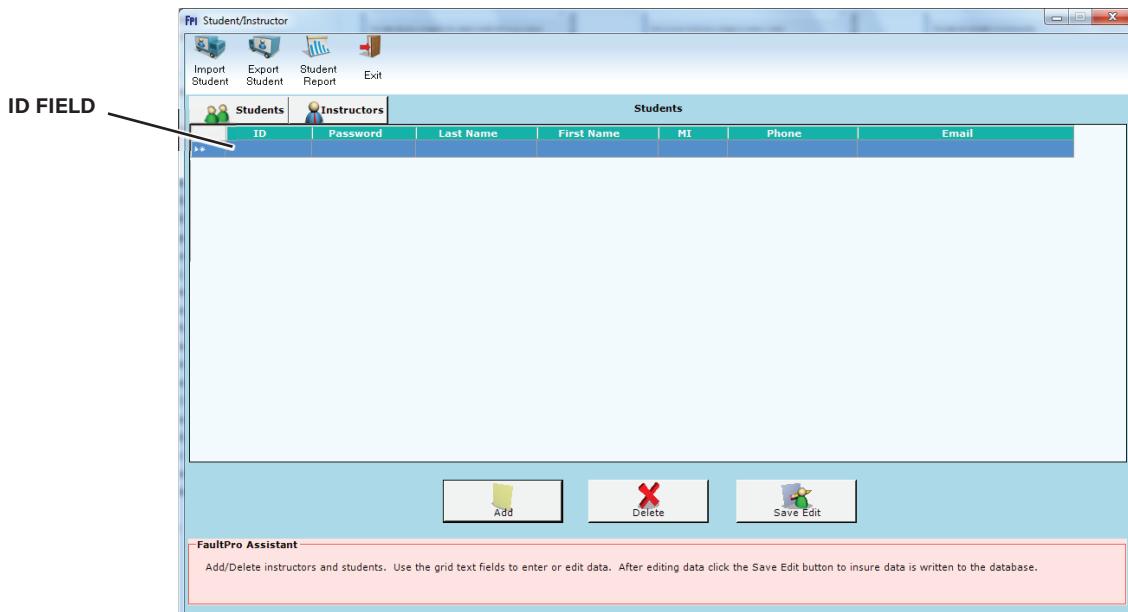


Figure 45. New Data Entry Line

- D. Click the newly added **ID** field and type in an instructor ID.  
Valid IDs must be of the data type integer, which is limited to a value between 0-255.
- E. Press the **Tab** key to continue to the next field, **Password**.  
The cursor should appear in the password field.
- F. Select and type in a password for yourself.  
Passwords must be of the string data type, meaning that they may be any combination of alphanumeric characters not exceeding 25 characters.
- G. Press the **Tab** key to continue to the next field, **Last Name**.  
The cursor should appear in the Last Name field.
- H. Type in your last name and press the **Tab** key to continue to the next field, **First Name**.
- I. Enter the appropriate data into the remaining fields using the same steps provided earlier. Note that the only required fields are: ID, Password, Last Name, and First Name.

- J. Once you have populated the instructor data, click the **Update** button to add yourself to the instructor database.
- 

**NOTE**

If after reviewing your information, you find that a field was incorrectly entered, you can edit the field(s) by clicking the erroneous field, editing the data, and then clicking the Save Edit button.

---

3. Perform the following substeps to exit the software and log back in as yourself (rather than use the default instructor Login).
  - A. Press the **Exit** button, located at the top of the screen, to exit the Student/Instructor utility.  
The Instructor Options dialog should appear.
  - B. Click the **Logout** button to log out of FaultPro.  
The FaultPro Instructor Login dialog appears.
4. Log back in using the **ID** and **Password** that you defined when you added yourself to the Instructor database and then click **OK**.

## 5.2

## ADD STUDENTS TO THE DATABASE

Students are added to FaultPro's Student database using the Students/Instructors utility, in a manner similar to that used to add instructors.

1. If you are not currently logged into the FaultPro Instructor program, log in using your ID number and password.

2. From FaultPro's Instructor Options dialog, click the **Students/Instructors** button.

The Student/Instructor dialog should appear similar to that shown in figure 46.

3. Perform the following substeps to add a student to the student database.

- A. Click the **Students** tab to verify that the tab is selected.

The Students tab should appear similar that shown in figure 46.

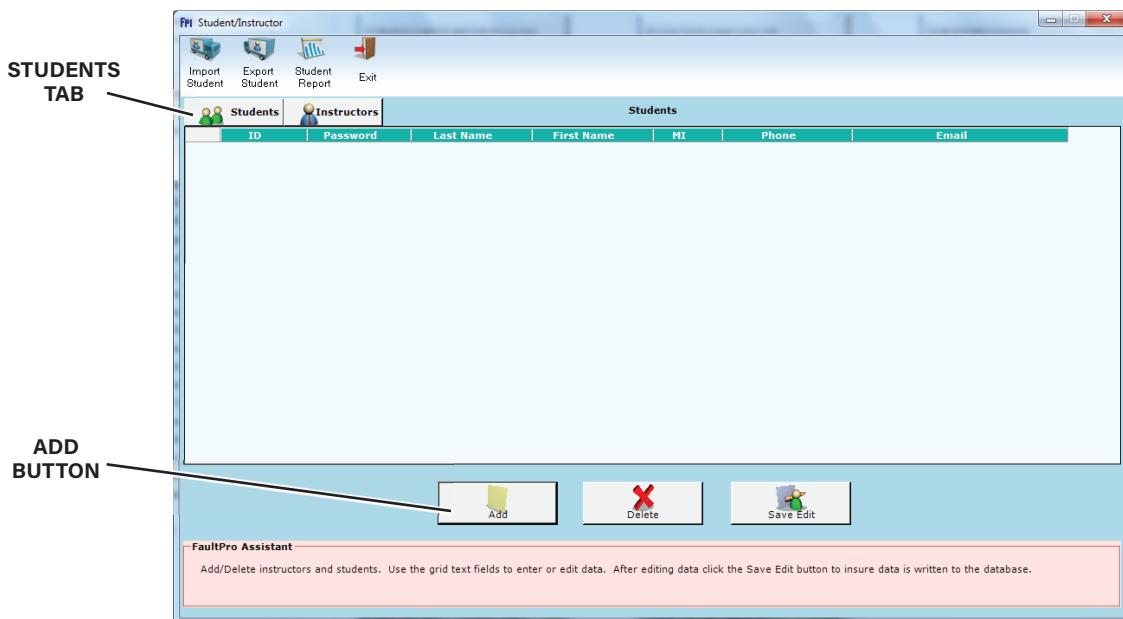


Figure 46. The Edit Student Screen

- B. Click the **Add** button to begin the process of adding a student to the database.

A new line appears highlighted in the student list, prompting you to populate the line with student data.

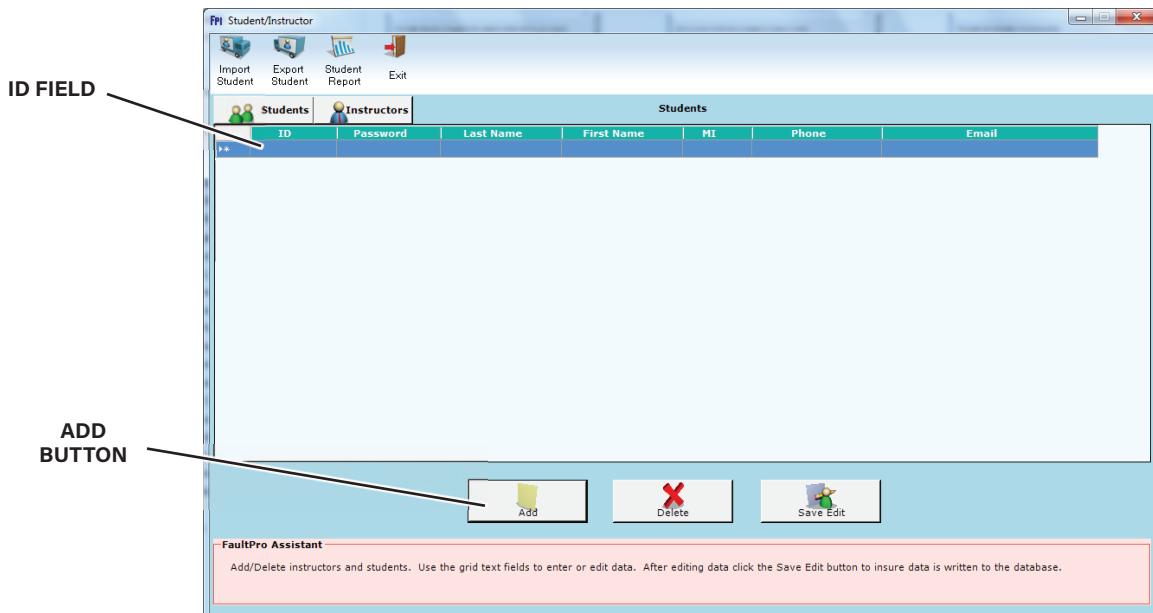


Figure 47. New Data Entry Line

- C. Click the newly added **ID** field and type in the student's identification number. Valid IDs must be of the data type integer, nine digits or less.
- D. Press the **Tab** key to continue to the next field, **Password**.  
The cursor should appear in the password field.
- E. Select and type in the student's **password**.  
Passwords must be of the string data type, meaning that they may be any combination of alphanumeric. The password cannot exceed 25 characters.

- F. Press the **Tab** key to continue to the next field, **Last Name**.  
The cursor should appear in the Last Name field.
  - G. Type in the student's last name and press the **Tab** key to continue to the next field, **First Name**.
  - H. Type in the student's first name and press the **Tab** key to continue to the next field, **MI**.
- 

#### NOTE

The student's middle initial, phone number, and email fields are optional and not required to complete student entry. Pressing the **Enter** key at any time after the required fields completes data entry for the current student and creates a new student entry form.

---

- I. Type in the student's middle initial (optional) and press the **Tab** key to continue to the next field, **Phone**.
- J. Type in the student's phone number (optional) and then press the **Tab** key to continue to the next field, **Email**.
- K. Type in the student's Email address (optional) and then press the **Tab** or **Enter** key to complete data entry for the current student and create a new student entry form (line).
- 5. Repeat substeps **B** through **K** to populate the student database.
- 6. Once completed, click the **Update** button to accept your entries and add the recently added students to the database.
- 7. Press the **Exit** button to exit the Students/Instructors utility and return to the Instructor Options dialog.

## 5.3

## CREATE A NEW CLASS

In this procedure, you will be led through the process of creating a new class. In this procedure, you will use the Add Class wizard to create a new class, assign a learning system specific template, and add students from FaultPro's student database.

1. If you are not currently logged into the FaultPro Instructor program, log in using your ID number and password.

2. Click the **Classes** button to display the Classes dialog.

The Classes dialog should appear similar to that shown in figure 48.

The Classes dialog provides a list of classes and should appear empty the first time you add a class.

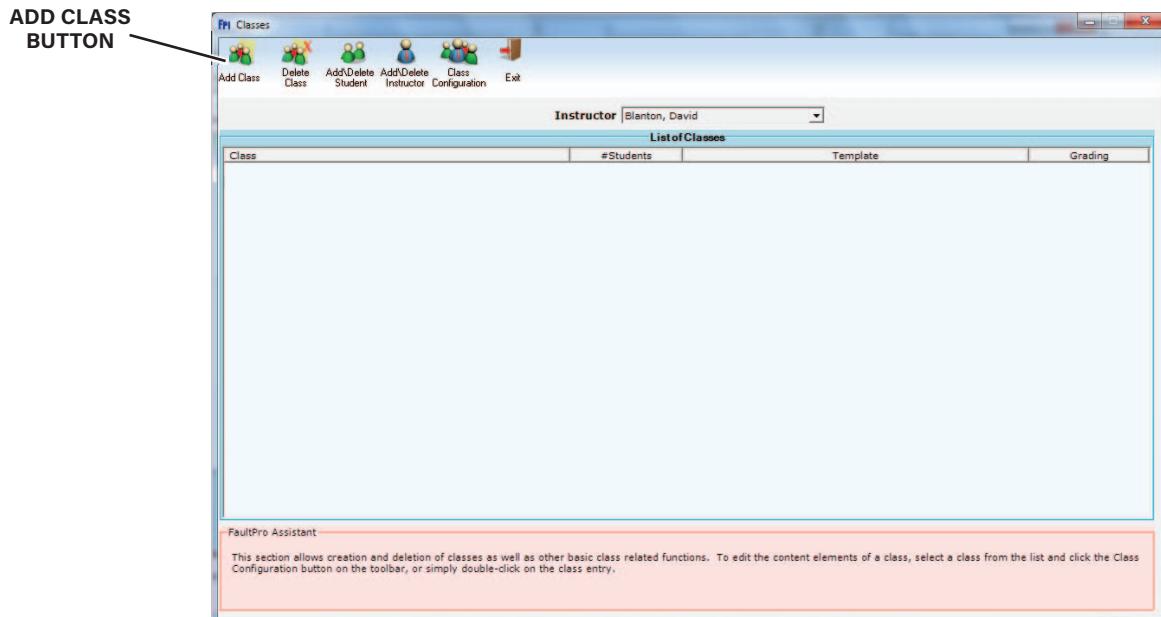


Figure 48. Classes Dialog

3. Perform the following substeps to create and add a class to the FaultPro database.
  - A. Click the **Add Class** button to start the **Create New Class Wizard** shown in figure 49.

The wizard will appear on your screen; its Step 1: Name the Class entry field is highlighted and it contains the default class name, Class 1. In addition, because class names must be unique, the wizard provides a list of existing class names.

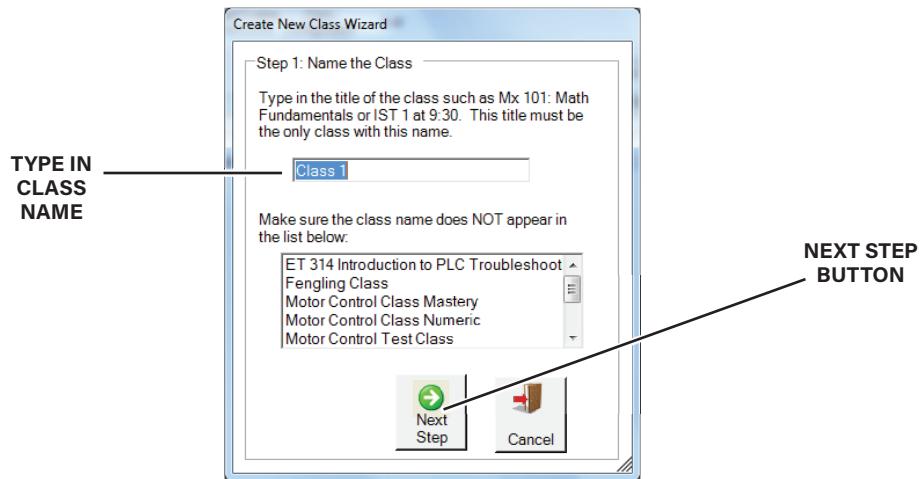


Figure 49. Create New Class Wizard

- B. Type in the name that you wish to give your class and then click the **Next Step** button.

In applications where several similar courses are being offered, you can differentiate between classes by including Section numbers or meeting times (e.g. ET 234 Intro to PLCs MW 10:05-11:45)

The class name is entered and the wizard continues to Step 2: Select the Template.

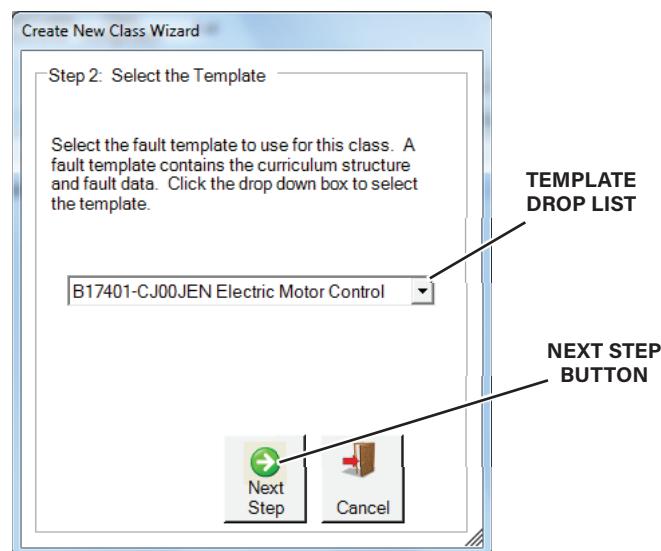


Figure 50. Wizard Step 2: Select the Template

- C. Click the template drop list to display a listing of hardware fault templates.

The template drop list will appear.

If, for example, you are creating class that is supported by the B40080 Mastering Programmable Controllers curriculum template.

- D. Select the template that matches your learning system hardware and then click the **Next Step** button to continue class configuration.

The selected template is associated with the class and the wizard continues to the next step; Step 3 Add Students.

This step, as its name implies, enables the user to add or remove students from your class.

The Students Available list provides a directory of all the students that have been added to the student database using the Students/Instructors utility.

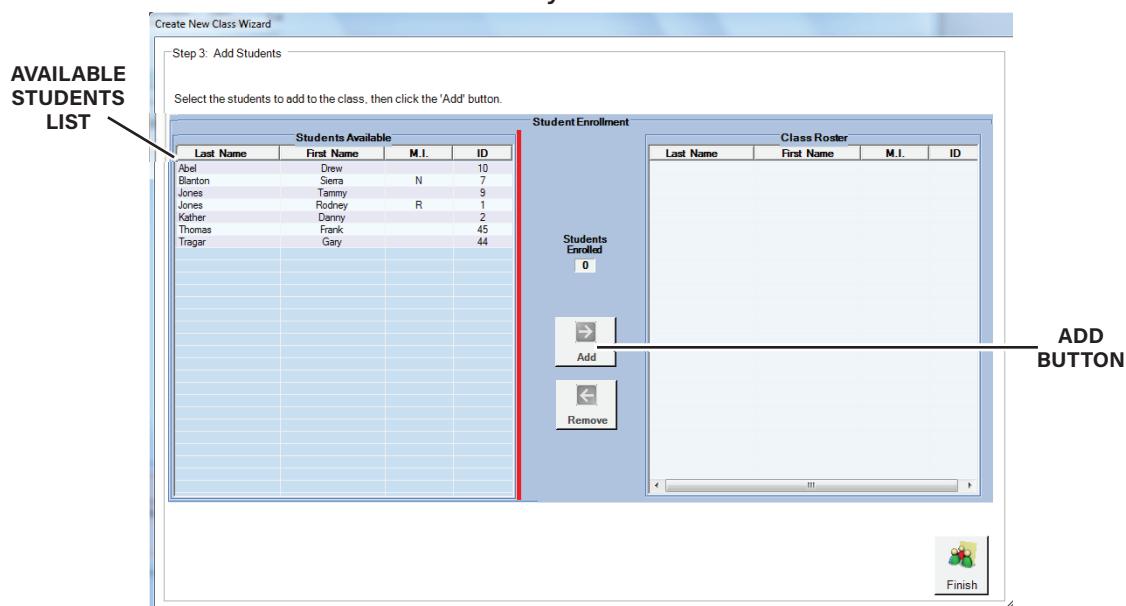


Figure 51. Step 3: Add Students

- E. Select the student(s) that you wish to add to your class and then click the **Add** button to transfer the students to your Class Roster, as shown in figure 52.

Multiple students may be selected at one time by using the [Ctrl] + click, or [Shift] + click functions.

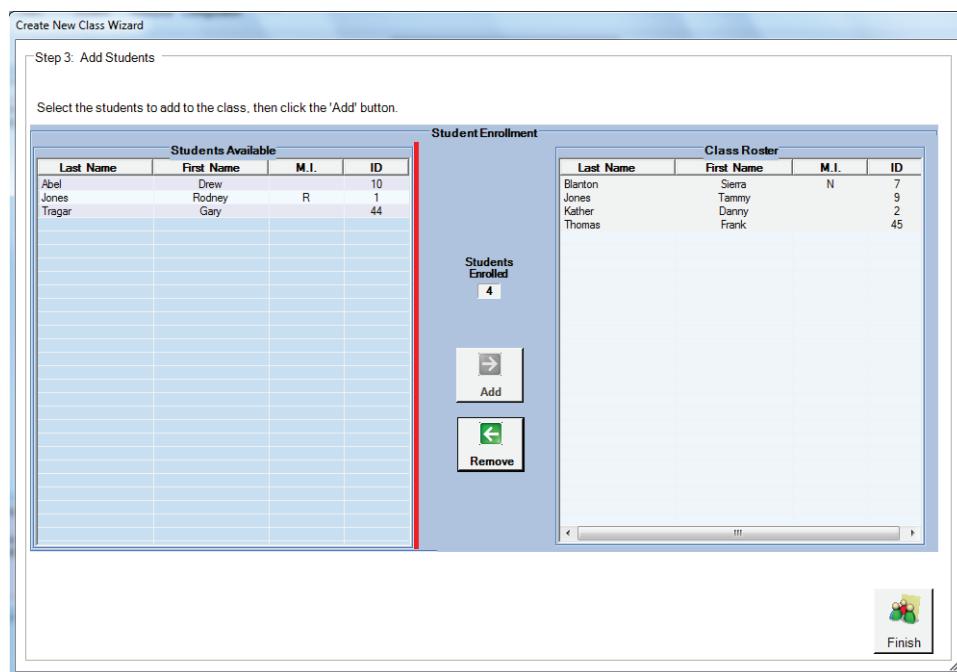


Figure 52. Students Added to Roster

4. Click the **Finish** button to return to the Instructor Options.

A dialog will appear indicating that you are Finished Creating the class.

5. Click **OK** to acknowledge and close the dialog.

The Classes utility will appear on your screen.

The class should now be set up to run. However, you may find it necessary to check and change the active faults in the fault mask to customize the template for your class. The next section contains instructions for performing this task.

## 5.4

## EDIT A CLASS TEMPLATE

A template provides a means of enabling and disabling all of a workstation's available faults.

Amatrol-supplied templates, however, are designed to complement and support learning system provided curriculum. They do this by timing the introduction of hardware faults so that they coincide with their presentation in the concepts and procedures provided in the curriculum as well as the hardware being used at the time.

Instructors may wish, however, to "tweak" their Amatrol-supplied templates so that they can test or emphasize a particular fault or skillset in their classroom activities. The instructor can change the fault masks at any time, even if the class is already running.

Before the instructor can modify a fault mask, he/she must understand how to open a template that contains the fault masks.

1. If you are not currently logged onto the FaultPro Instructor program as yourself, do it now.
2. Perform the following substeps to open the fault mask that you wish to edit.
  - A. From the Instructor Options screen, click the **Classes** button. The Classes utility should appear on your screen, similar to that shown in figure 53.

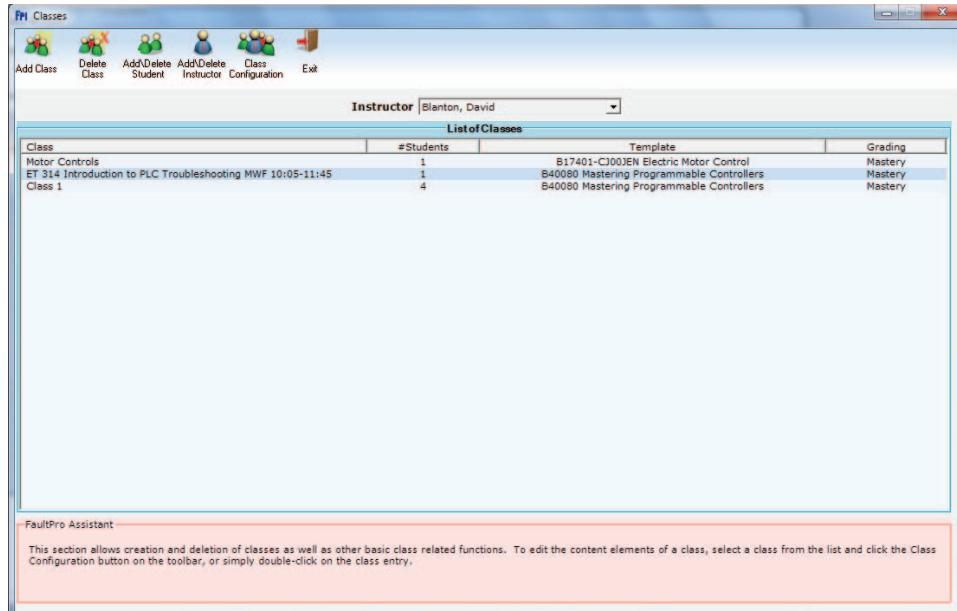


Figure 53. Template/Workstation Configuration Utility

- B. Double-click the class whose template you wish to view or edit.  
 The Class configuration dialog should appear displaying the fault template tree similar to that shown in figure 54.

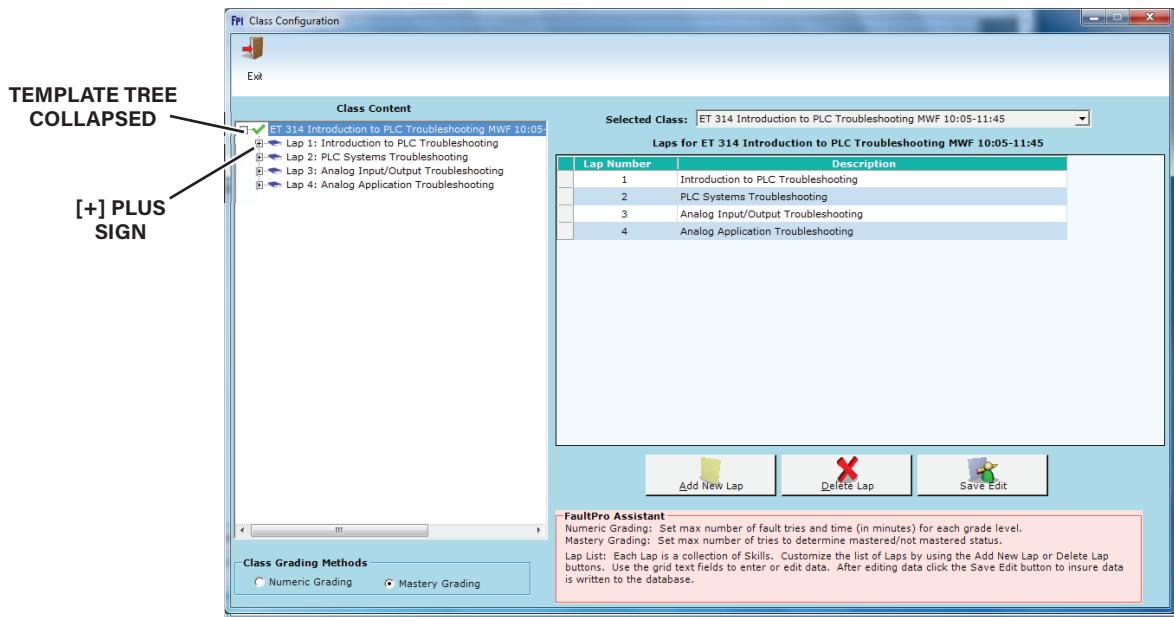


Figure 54. Class Configuration Dialog

The template tree and all of its associated objects are collapsed by default. Objects may, however, be expanded to show their contents by clicking the + sign next to the desired object, as shown in figure 55.

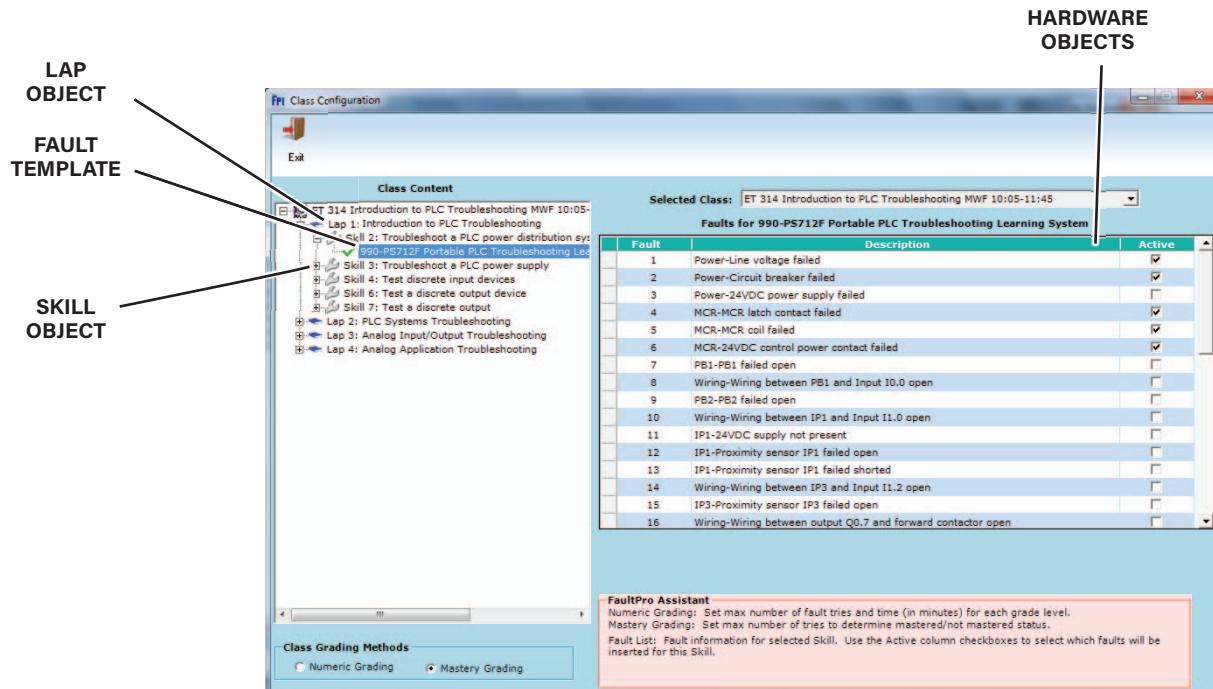


Figure 55. Template Expanded

The Components of the object tree are defined as follows.

**Fault Template** - A fault template is an organized collection of fault masks, provided as part of an Amatrol learning system. It consists of LAPs, Skills, and selected hardware in which faults are enabled and disabled.

**LAP object** - LAPs are an organized collection of fault masks for a given LAP. They consist of Skills containing selected hardware in which faults may be enable or disabled.

**Skill object** - Skills are an organized collection of hardware objects.

**Hardware objects** - Hardware objects are a collection of potential faults, organized by the hardware that they affect. Selecting a hardware object in the project tree enables the user to check and uncheck that hardware's potential faults making the fault active and inactive respectively. Figure 55, for example, shows the hardware object 990-PS712F Portable PLC Troubleshooting Learning System and its associated faults selected and made active in the edit window.

3. Perform the following substeps to edit the active faults of the currently selected template.
  - A. Expand the LAP containing the fault mask that you wish to modify. The object should expand to display all of the skills in the selected LAP.
  - B. Expand the Skill containing the fault mask that you wish to modify. The object should expand to display all of the hardware objects.
  - C. Select the hardware object in which the fault you wish to edit is located. If you wish to modify a power fault in the 990-PS712F for example, click the 990-PS712F Portable PLC Troubleshooting Learning System to display its faults.
  - D. Click the Active field corresponding to the fault that you wish to change.  
The Active field should update. If the fault was not active (unchecked), it will become active (checked). If the fault was active, it will become inactive.
  - E. Repeat the process for any other faults that you wish to edit.
4. Use step 3 to modify any other faults that you wish to change in this template.
5. Once you have completed editing template faults, click the **Save Edits** button to save your edits.
6. Click the **Exit** button to exit the Class Configuration screen and return to the Classes screen.
7. Use steps 2 through 6 to modify any other Class templates that you wish to edit.
8. Click the **Exit** button to return to the Instructor Options screen.

**5.5****SET THE GRADING CRITERIA**

FaultPro supports two grade assessment methods; Numeric and Mastery.

The Numeric method provides a more traditional, performance-based approach by producing grades on a 0 to 4 point scale (with 0 being the lowest grade, and 4 being the highest grade possible), while the mastery method produces competency-based, pass-fail results.

In this section, we will discuss both methods of grading and their configuration.

**5.51****Numeric Grading Configuration**

Newly created class templates are configured, by default, using the Mastery Grading method with Amatrol's default grade settings.

Instructors may wish to change grade settings:

- After making changes to the fault template so as to better reflect the number of faults in a fault mask
- To institute their own grading standards in the classroom
- To return the class grading from the competency-based, mastery grade setting method.

Instructions for editing the numeric grade settings are provided as follows.

1. Log into FaultPro using your ID number and password.

2. From the Instructor Options screen, click **Classes** to display all of your configured classes.

Your configured classes should appear similar to that shown in figure 56.

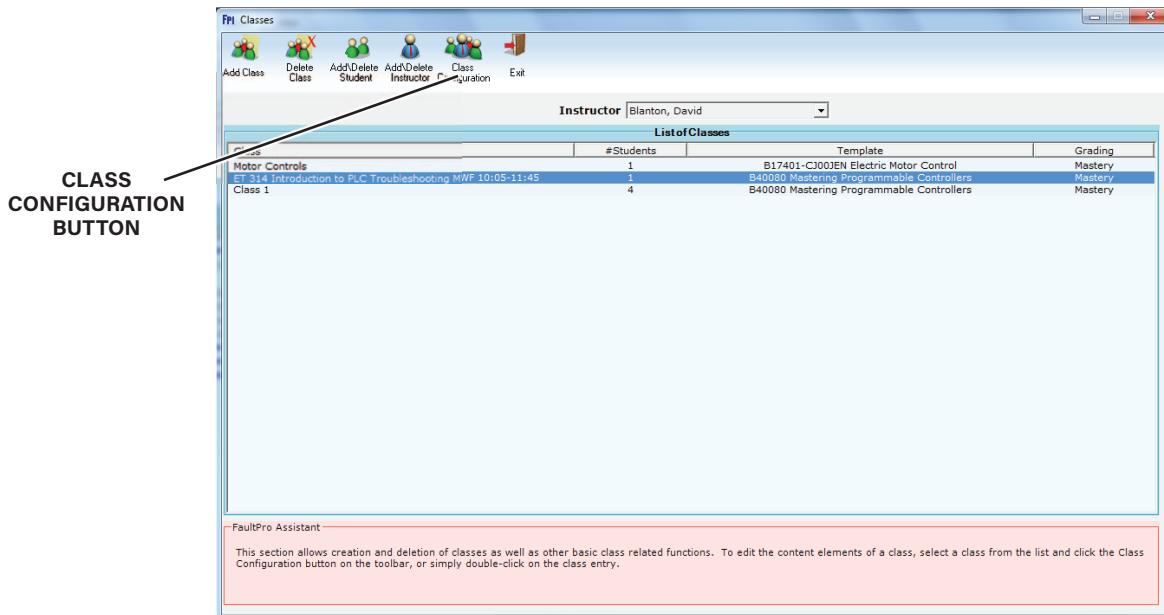


Figure 56. Classes Dialog

3. Select the class that's grading you wish to edit and then click the **Class Configuration** button to display the Class Configuration Screen. Notice the Class Grading options, located at the bottom of the Class Tree directory window.

Selecting the grading method here defines the grading method for the entire class template, as the software does not support multiple grading methods within a class.

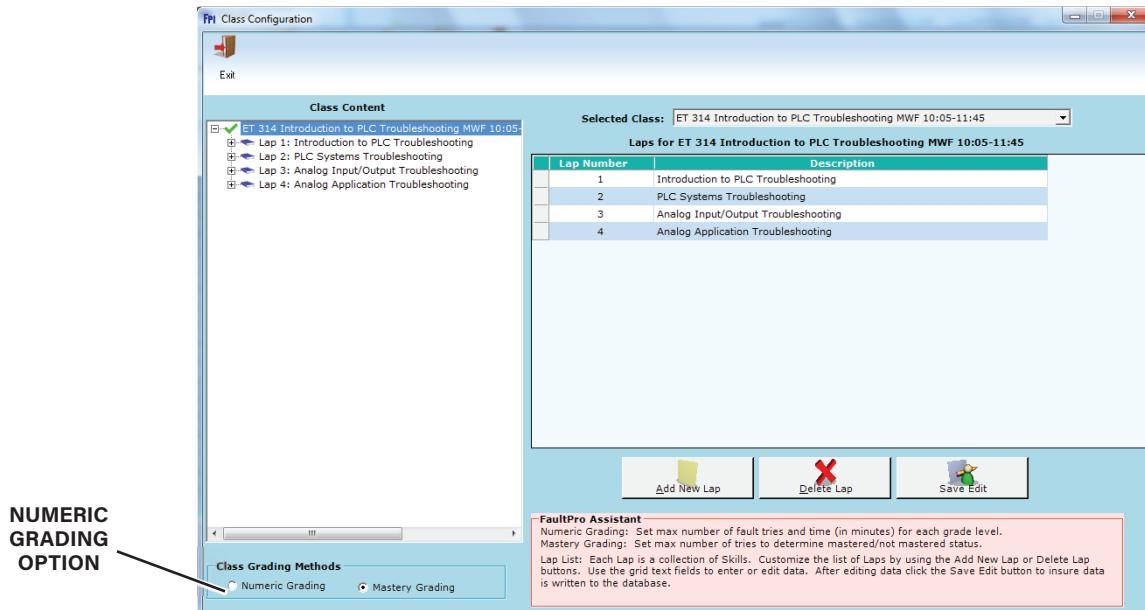


Figure 57. Class Configuration Screen

4. Click the **Numeric Grading** Option to define the option for currently selected Class (EET 234 Intro to PLCs in the example).
5. Click the plus sign [+] next to the LAP containing the skill that you wish to update.

If you intend to change the grade settings for every skill in the template, you may wish to start with the first LAP.

The LAP object will expand to display its contents.

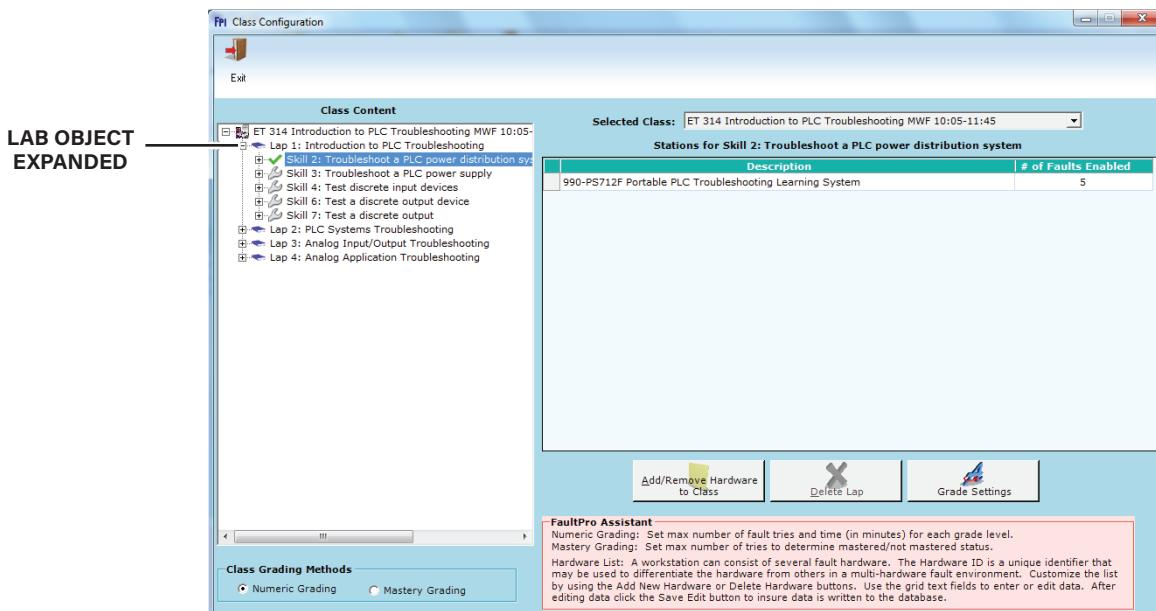


Figure 58. LAP Object Expanded Displaying Contents (Skills)

6. Select the **Skill** whose grade settings you wish to edit.

The Skill should appear selected (green checkmark next to it) and its hardware should appear in the workspace. In addition, notice that the workspace contains a column titled # of Faults Enabled, indicating the number of faults enabled for each piece of hardware.

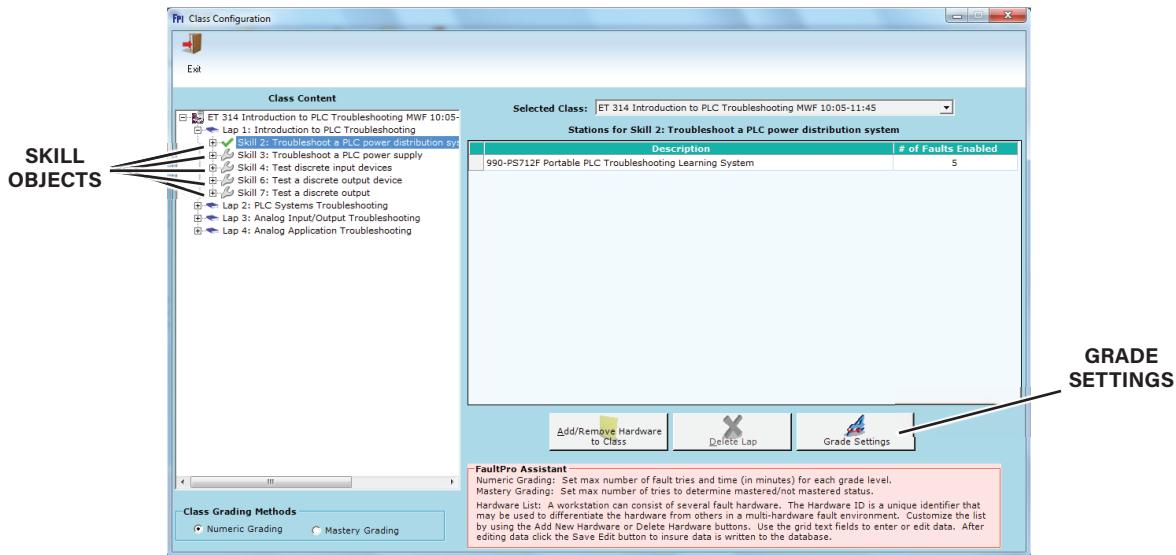


Figure 59. Skill Selected, Hardware Appears in the Workspace

7. Click the **Grade Settings** button, shown in figure 59, to display the grade settings for the selected skill, as shown in figure 60.

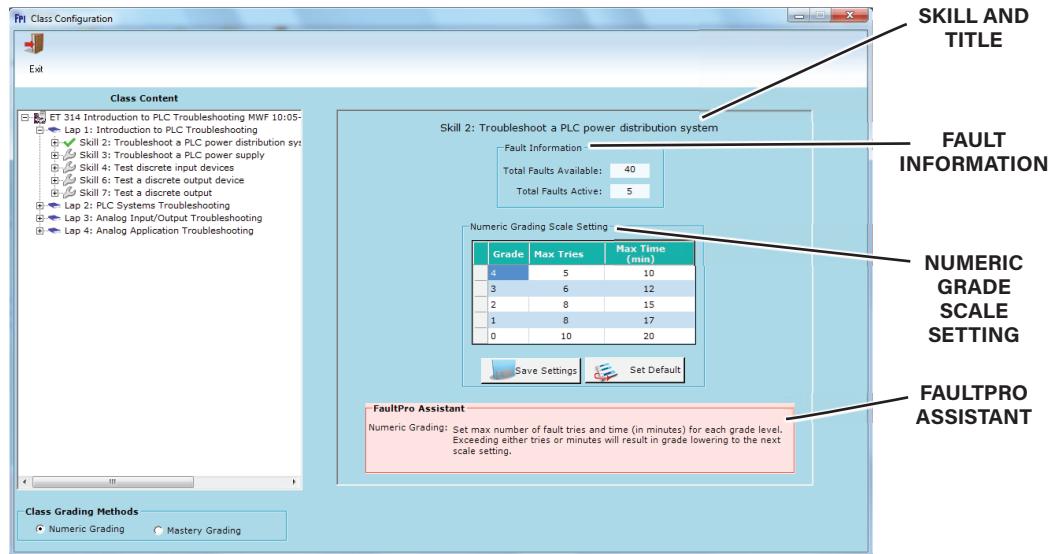


Figure 60. Grade Settings for Selected Skill

The workspace contains four components: the Skill# and Title, Fault Information, Numeric Grade Scale Setting, and a FaultPro Assistant. Each of these is described in detail below.

- **Skill # and Title** - This field identifies the skill for which the grade settings are applied.
- **Fault Information** - These non-configurable fields identify the maximum number of faults that may be configured for the skill (given the hardware) and the number of faults that are active.
- **Numeric Grade Scale Settings** - The Numeric Grading Scale Setting field provides a grading rubric that allows users to examine and edit the grade settings of the selected skill.

Two criteria are used to determine the student's grade in a troubleshooting skill; 1) the number of attempts that a student uses to correctly identify a fault, and, 2) the amount of time, in minutes, that it takes to do it. If either of these measures is exceeded, the grade suffers accordingly. In figure 61, for example, a student must identify all 4 faults in 5 attempts, in less than 10 minutes or their grade suffers accordingly.

Also included in the area are a Save Settings button and a Set Default (settings) button that enable the instructor to apply their own grade settings or apply FaultPro's default settings to the rubric.

The following algorithms are used to calculate the Numeric Grading's Default Settings.

NUMERIC GRADING ALGORITHMS		
Grade	Max Tries	Max Time (min.)
4	...is equal to the number of active faults times 1.0 tries.	...is equal to the number of active faults times 2.0 minutes.
3	...is equal to the number of active faults times 1.2 tries.	...is equal to the number of active faults times 2.4 minutes.
2	...is equal to the number of active faults times 1.5 tries.	...is equal to the number of active faults times 3.0 minutes.
1	...is equal to the number of active faults times 1.7 tries.	...is equal to the number of active faults times 3.4 minutes.
0	...is equal to the number of active faults times 2.0 tries.	...is equal to the number of active faults times 4.0 minutes.

Figure 61. Numeric Grading Algorithm

- **FaultPro Assistant** - The FaultPro Assistant provides helpful information and instruction regarding the current screen.

8. Perform the following substeps to apply Amatrol's default grade settings to the currently selected skill. If you do not wish to use the default skill settings, but instead wish to modify the settings manually, continue to substep 9 to do so.
  - A. Click the **Set Default** button to apply Amatrol's default grade settings to the selected skill.

You may notice that the grade settings change as you do this.
  - B. Click the **Save Settings** button to save your new settings.
  - C. If you wish to apply default grade settings for any other skills in the currently selected LAP, refer to steps 6 through 8 as a reference to do so.
  - D. If you wish to edit a skill contained in another LAP in the class template, use steps 5 through 8 as a reference to do so.
  - E. Skip Step 9 and continue to step 10.
9. Perform the following substeps to manually edit the rubric.
  - A. Select the grade setting that you wish to edit. If you wish to edit the Max tries for a grade of 4, for example, click the Max tries column corresponding to Grade level 4.

The field will appear blue.
  - B. Type in the value that you wish to define as the new Grade setting (Max Tries or Max Time) and then press the **Enter** key.
  - C. If you wish to edit other grade settings in the rubric, modify those settings using substeps A and B to do so. Otherwise, continue to substep D.
  - D. Click the **Save Settings** button to save your new settings.

If you wish to modify the grade settings of multiple skills, you can make all of your modifications and then click the **Save Settings** button to save all of the settings at once.
10. Click the **Exit** button to close the Class Configuration screen.

The Class Configuration screen will disappear leaving the Classes screen.
11. Click the **Exit** button to return to the Instructor Options Screen.

The Classes screen will disappear leaving the Instructor Options screen.
12. Click the **Logout** button to exit the FaultPro Instructor's software

## 5.52 Mastery Grading Configuration

FaultPro Software does not provide default grade settings for Mastery Grading. Users, therefore, MUST configure grade settings for all skills in the class template if they wish to implement the Mastery Grading method.

Instructions for defining the numeric grade settings are provided as follows.

1. Log in to FaultPro using your ID number and password.
2. From the Instructor Options screen, click **Classes** to display all of your configured classes.

Your configured classes should appear similar to that shown in figure 62.

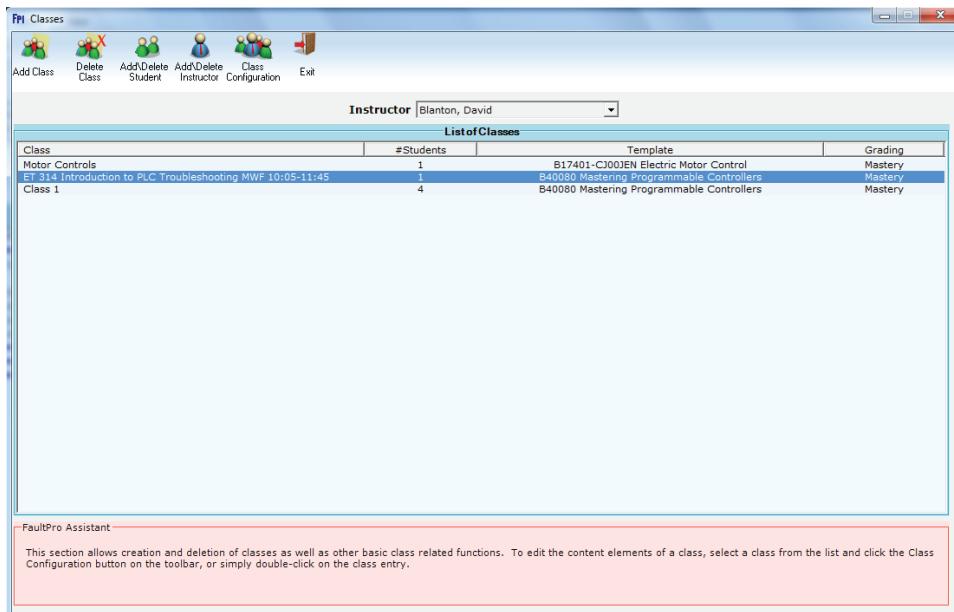


Figure 62. Classes Dialog

3. Select the class that's grading you wish to edit and then click the **Class Configuration** button to display the Class Configuration Screen.

Notice the Class Grading options, located at the bottom of the Class Tree directory window.

Selecting the grading method here defines the grading method for the entire class template, as the software does not support multiple grading methods within a class.

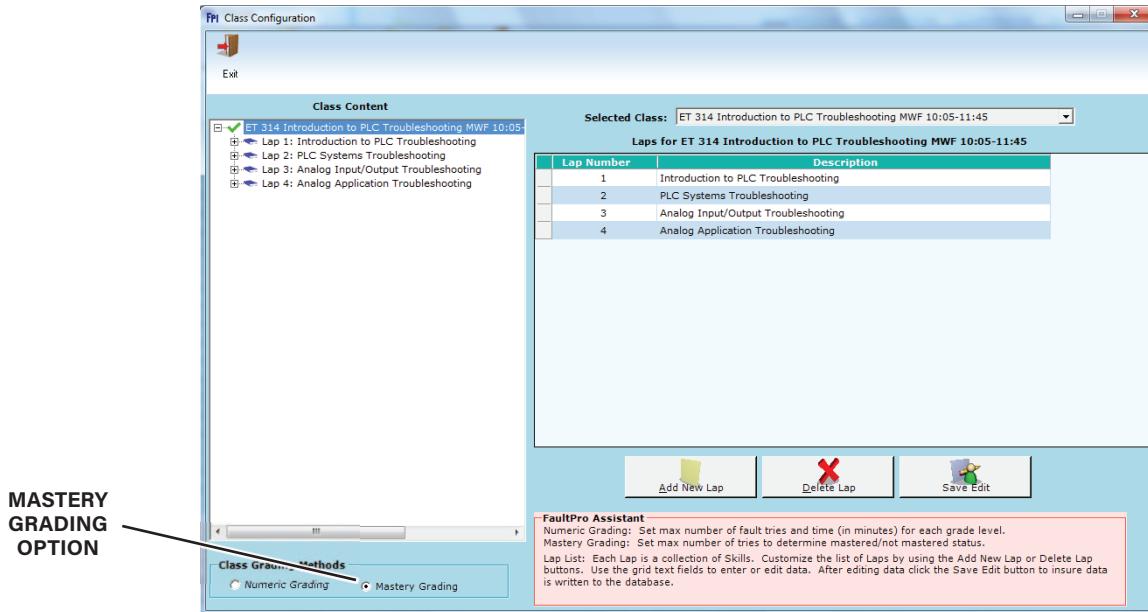


Figure 63. Class Configuration Screen

4. Click the **Mastery Grading Option** to define the option for currently selected Class (EET 234 Intro to PLCs in the example).

5. Click the plus sign [+] next to the LAP containing the skill that you wish to update.

If you intend to change the grade settings for every skill in the template, you may wish to start with the first LAP.

The LAP object will expand to display its contents.

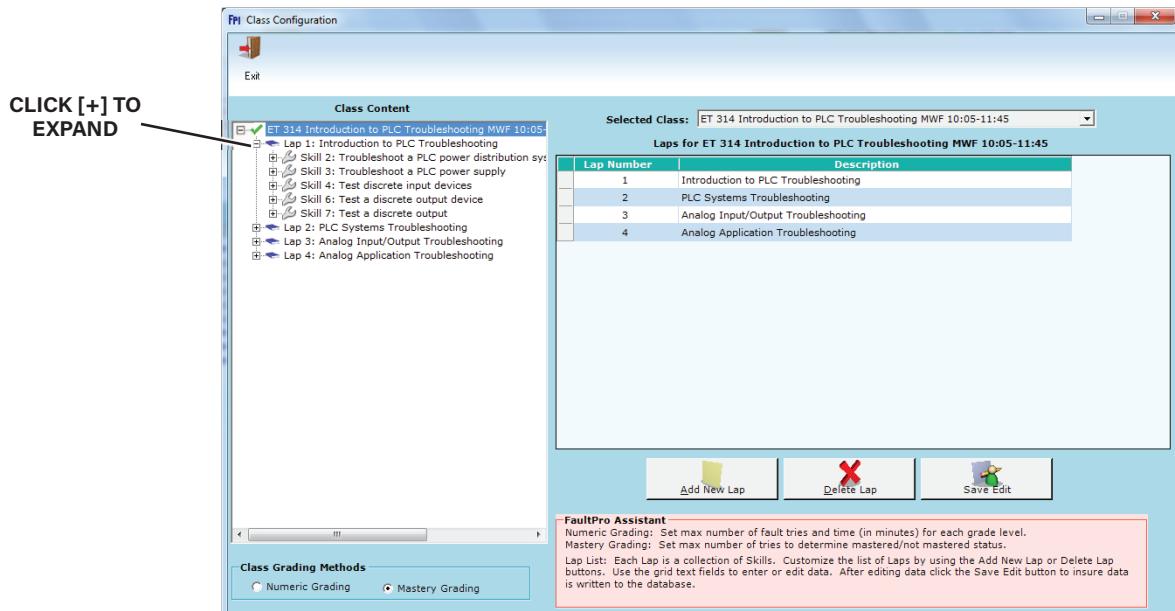


Figure 64. LAP Object Expanded Displaying Contents (Skills)

6. Select the **Skill** whose grade settings you wish to edit.

If you intend to change the grade settings for every skill in the LAP or Skill, you may wish to start with the first Skill.

The Skill should appear selected (green checkmark next to it) and its hardware should appear in the workspace. In addition, notice that the workspace contains a column titled # of Faults Enabled, indicating the number of faults enabled for each piece of hardware.

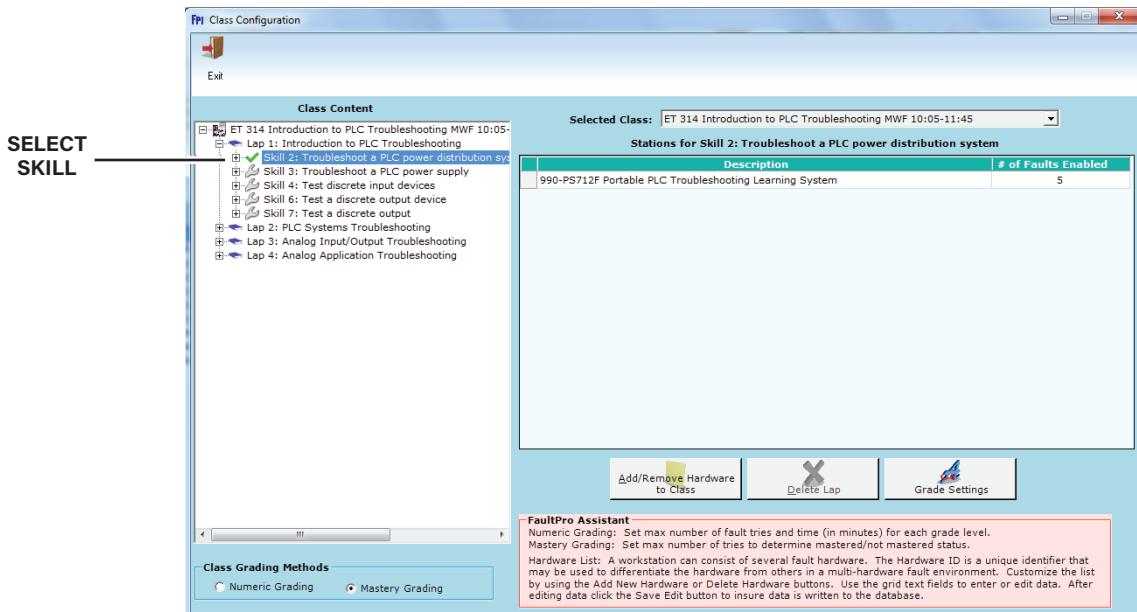


Figure 65. Skill Selected, Hardware Appears in the Workspace

7. Click the **Grade Settings** button, shown in figure 66, to display the grade settings for the selected skill.

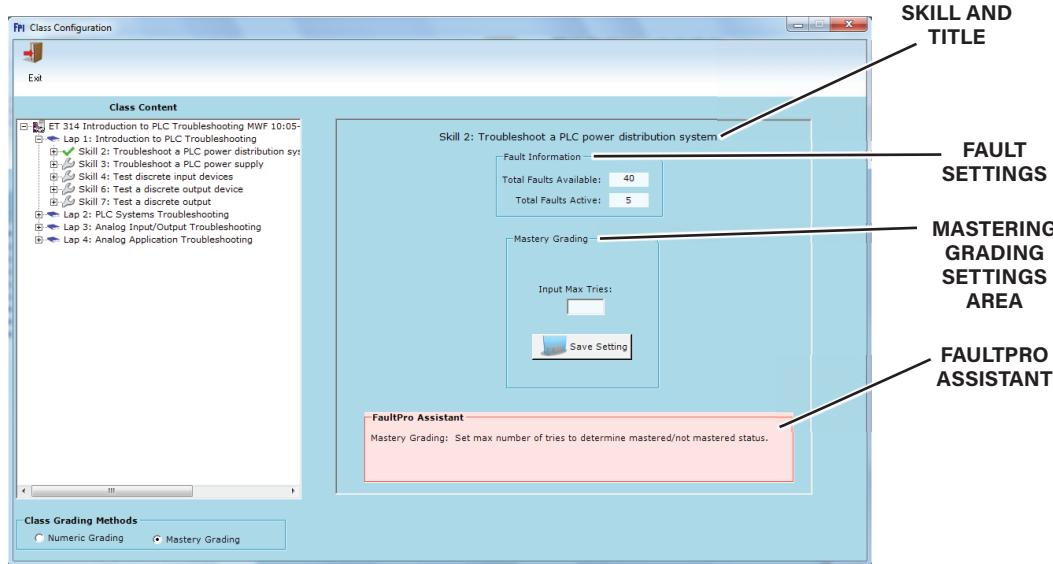


Figure 66. Grade Settings for Selected Skill

The workspace contains four components: the Skill# and Title, Fault Information, a Mastery Grading Settings/Area, and a FaultPro Assistant. Each of these is described in detail below.

- **Skill # and Title** - This field identifies the skill for which the grade settings are applied.
- **Fault Information** - These non-configurable fields identify the maximum number of faults that may be configured for the skill (given the hardware) and the number of faults that are active.
- **Mastery Grading Settings/Area** - The Mastery Grading Area provides an Input Max Tries field and a Save Settings button that enable the instructor to define number of attempts the user may have to identify all faults within a fault mask before failing the troubleshooting assessment for that skill. Inserting a 7 in the field for example, would provide the student 7 attempts to identify the 5 active faults in the mask without failing the assessment.
- **FaultPro Assistant** - The FaultPro Assistant provides helpful information and instruction regarding the current screen.

8. Perform the following substeps to define the maximum number of attempts that a student may make in identifying all of the active faults in a fault mask and pass the assessment.
  - A. Click the **Input Max Tries:** field and type in the value that you wish to assign to the field. Be sure to take into account the total number of active faults, identified above. The Max tries cannot be less than the total active faults.
  - B. Click the **Save Setting** button to save your setting for the currently selected skill.
9. If you wish to edit the grade settings for other skills in the currently selected LAP, use steps 6 through 8 as a guide to do so.
10. If you wish to edit the grade settings for skills in other LAPs in the series, use steps 5 through 8 as a guide to do so.
11. Once you have completed your grade setting edits, click the **Exit** button to close the Class Configuration screen.  
The Class Configuration screen will disappear leaving the Classes screen.
12. Click the **Exit** button to return to the Instructor Options Screen.  
The Classes screen will disappear leaving the Instructor Options screen.
13. Click the **Logout** button to exit the FaultPro Instructor's software

## 5.6

## IMPORTING AND EXPORTING OF FAULT TEMPLATES

FaultPro supports the importing and exporting of fault templates. The import function enables FaultPro users to download and use the latest and most current templates available from Amatrol's website or support personnel. In addition, some support operations require users to export and send their templates in to Amatrol for support.

In this section, we will provide instructions for the importation and exportation of fault templates.

## 5.6.1 Export a Fault Template

Instructions for exporting a Fault Template are provided as follows:

1. Log into FaultPro using your ID number and password.
2. From the Instructor Options screen, click **Template/Workstation Configuration** to display Template/Workstation Configuration screen.

The Template/Workstation Configuration screen should appear, its workspace containing the template listed in the Selected Template: field (first template, alphabetically, in the FaultPro database), as shown in figure 67.

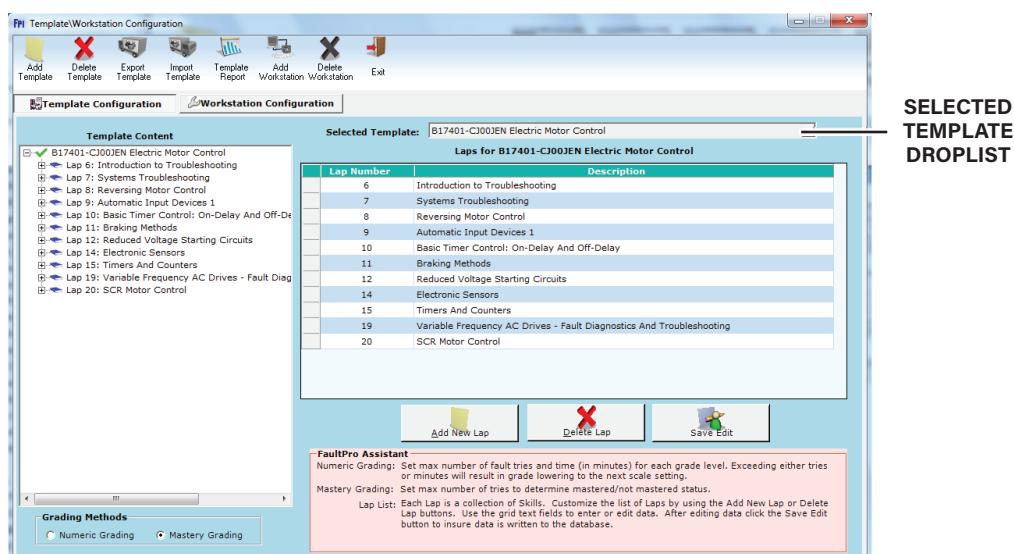


Figure 67. Template\Workstation Configuration Screen

3. Click the **Selected Template** droplist to display a listing of available templates.
4. Select the template that you wish to export. If, for example, you wish to export the Motor Control 1 Template, click the Motor Control 1 – 890-FTS-1 Template. The Template will appear similar to that shown in figure 67.

5. Click the **Export Template** button, located in FaultPro's toolbar and shown in figure 67, to begin the template export process.  
The Save As will appear prompting you to enter the location and name of the exported template.

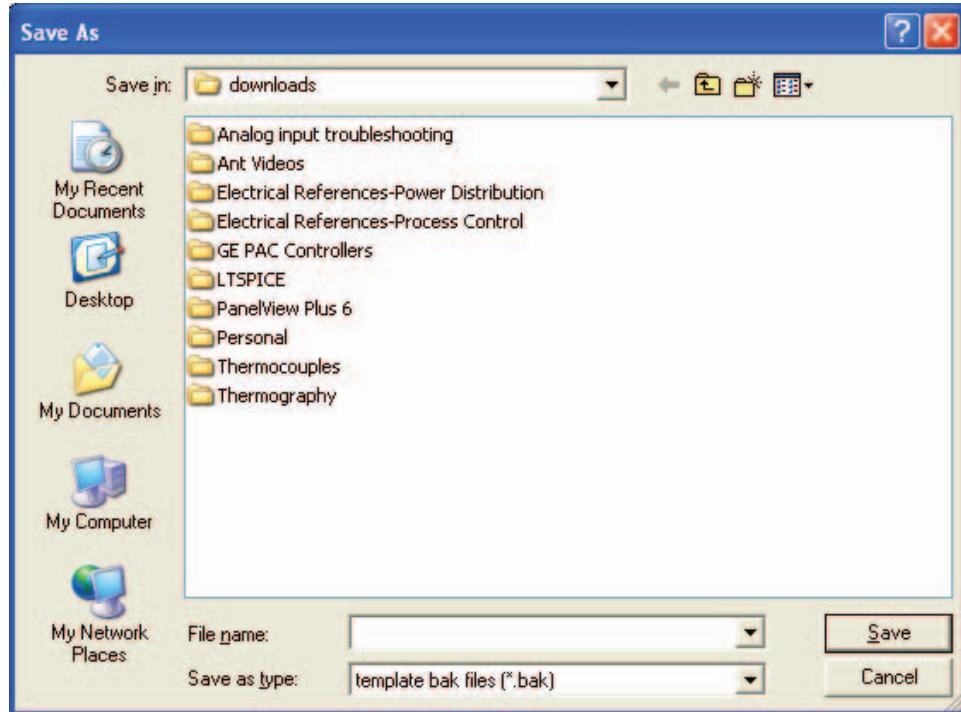


Figure 68. Save As Dialog

6. Use the dialog to navigate to the desired storage location and enter the filename under which you wish to save the template.
7. Click the **Save** button to complete the template export process.  
An Instructor dialog will appear indicating "Export template completed" and displaying the path and filename of the exported template.
8. Click **OK** to acknowledge and close the dialog.

## 5.62 Import a Fault Template

Instructions for importing a Fault Template are provided as follows:

1. Log into FaultPro using your ID number and password.
2. From the **Instructor Options** screen, click **Template/Workstation Configuration** to display the Template/Workstation Configuration screen.

The Template/Workstation Configuration screen should appear, its workspace containing the template listed in the Selected Template: field (first template, alphabetically, in the FaultPro database), as shown in figure 69.

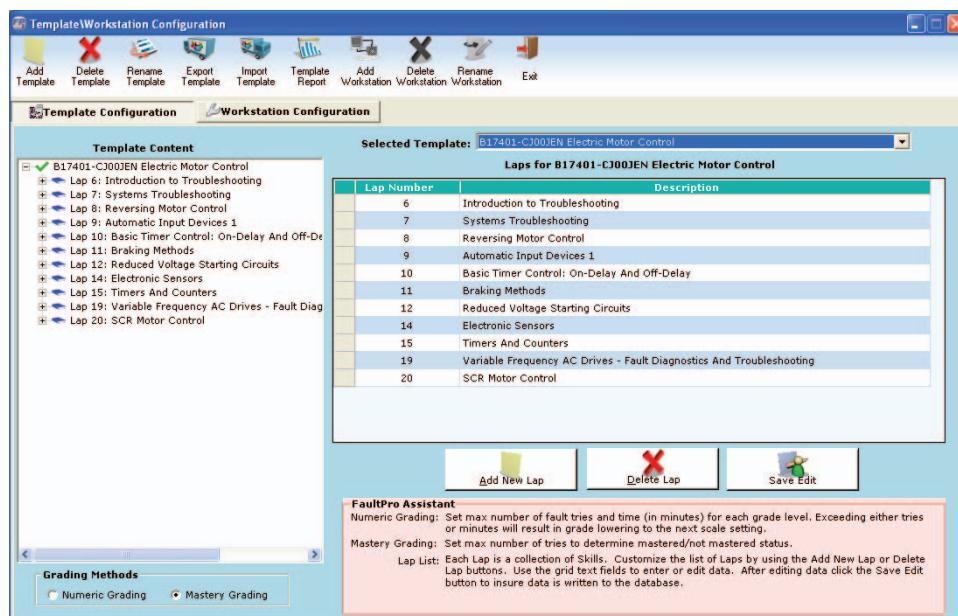


Figure 69. Template/Workstation Configuration Dialog

3. Click the **Import Template** button located in FaultPro's toolbar to begin the import process.

The Open dialog should appear prompting you to define the location and filename of the template file that you wish to import. Templates files listed in the currently selected folder (those files having the .bak extension) are displayed in the listbox. The template file BB240-BB00UEN\_T7018 Power and Control Electronics Troubleshooting.bak, is shown in figure 70.

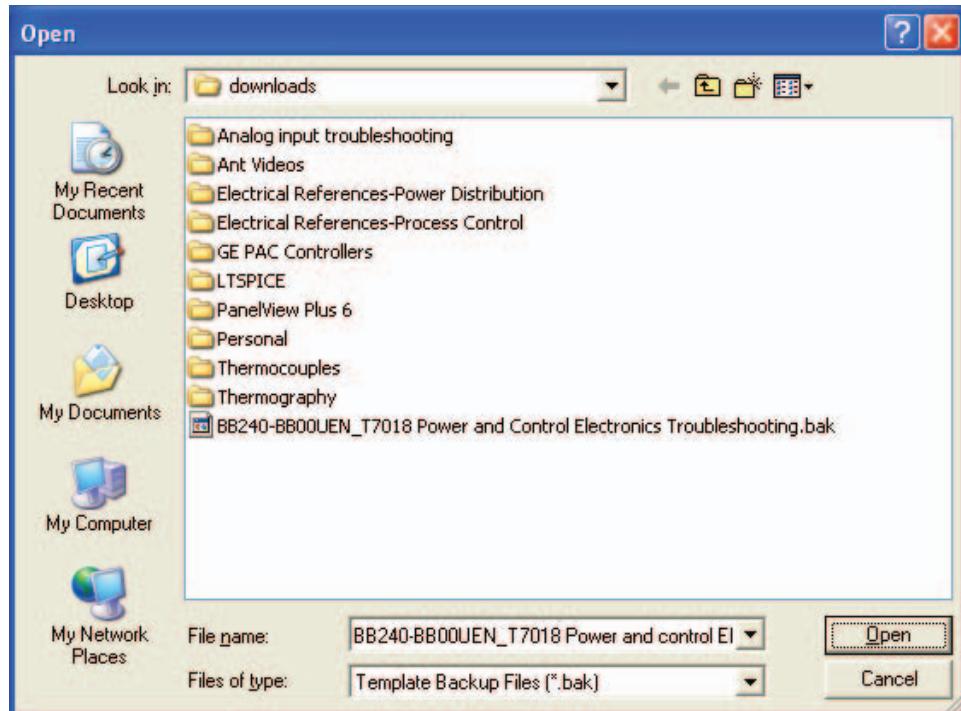


Figure 70. Open Dialog

4. Use the **Open** dialog to navigate to and then double-click the template file that you wish to import.

Another dialog, FaultPro Import, will appear prompting you to define the Template name under which the template will be named under which the template will appear in FaultPro.

5. Type the **File name** that you wish to give the imported template and then click the **OK** button.

The template file is imported into FaultPro and a FaultPro dialog appears indicating that the import process is complete.

6. Click the **OK** button to close the dialog.

The FaultPro dialog disappears and the template is imported.

You can verify that the template has been imported by clicking the Selected Template dropdown to display the newly added template, as shown in figure 71.

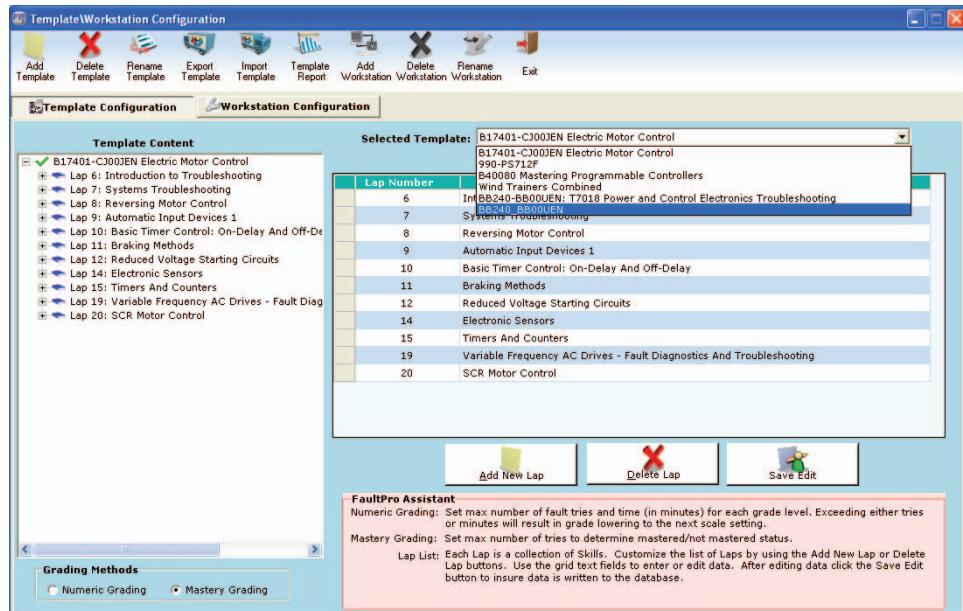


Figure 71. Selected Template Dropdown Displaying Newly Imported Template

## SECTION 6

# Running a Class

Once you have installed and configured the software and setup your class, you are ready to run a class using the fault insertion system.

This section provides the most common Student and Instructor procedures associated with FaultPro. Familiarizing yourself with these procedures should prepare you for most of the FaultPro-related questions and events that should arise in your class.

6.1

## DAILY STARTUP

FaultPro's Student and Instructor programs require that the computer running the FaultPro's Server software is running before log in to allow the exchange of data with the database. For this reason, the computer containing the FaultPro Server should be started before any other station, or be left running at all times.

It should also be mentioned that the Instructor and Student programs cannot access the database of a server computer system that is in the Standby or Hibernating state.

The Procedure for disabling the Standby and Hibernating States is provided below.

1. Perform the following substeps to disable the Standby and Hibernating States of the computer serving as a FaultPro server. Note that steps may be slightly different and images may appear differently depending on your version of Windows.
  - A. Power up and log into the computer containing the FaultPro Server Software.
  - B. Click **Start** and then search for **Control Panel** to display the Control Panel group.

Windows Control Panel should appear on your screen, similar to that shown in figure 72.

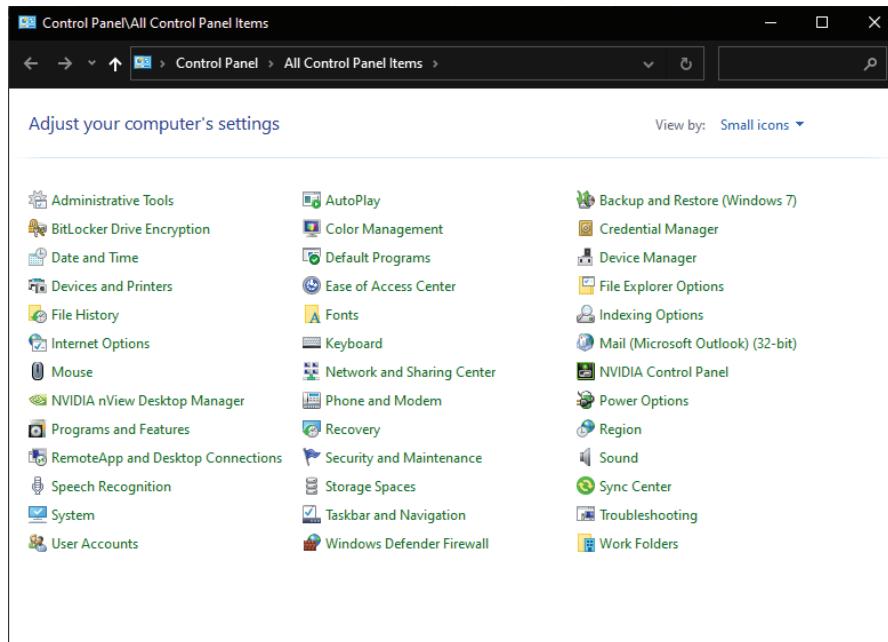


Figure 72. Control Panel

C. If the Control Panel does not appear similar to figure 72, but appears similar to figure 73 instead, click the **View by** option and select **Small icons** to display the Control Panel group as shown in figure 72.

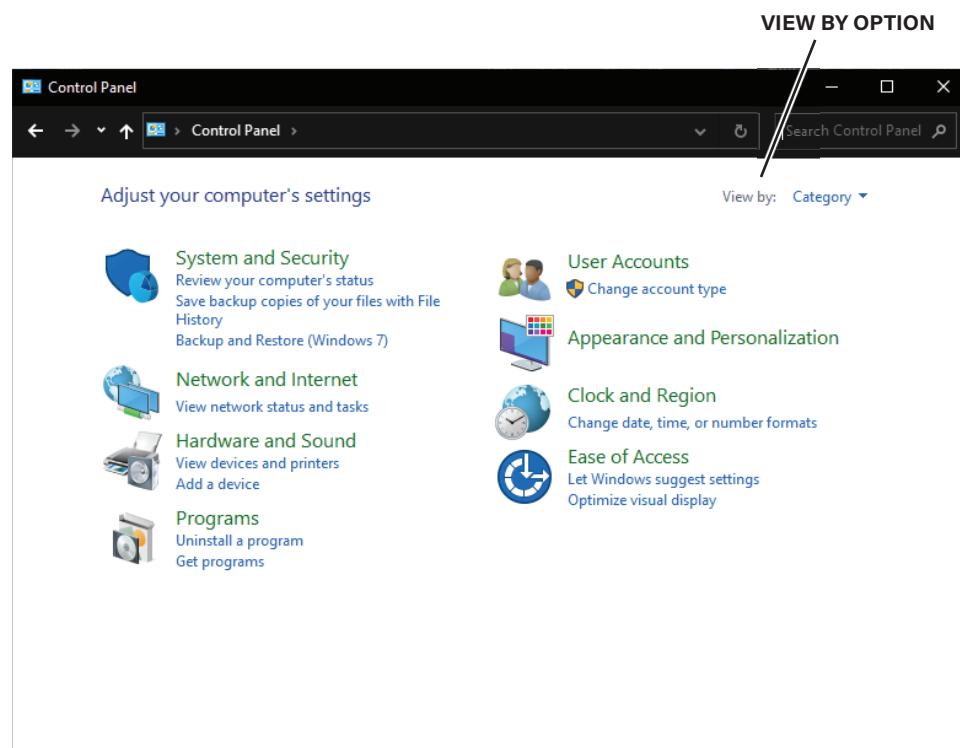


Figure 73. Control Panel, Category View

- D. Double-click the **Power Options** icon to display the utility.  
The Power Options dialog should appear on your screen.
- E. Click the **Change when the computer sleeps** option, to display the sleep settings for the computer.

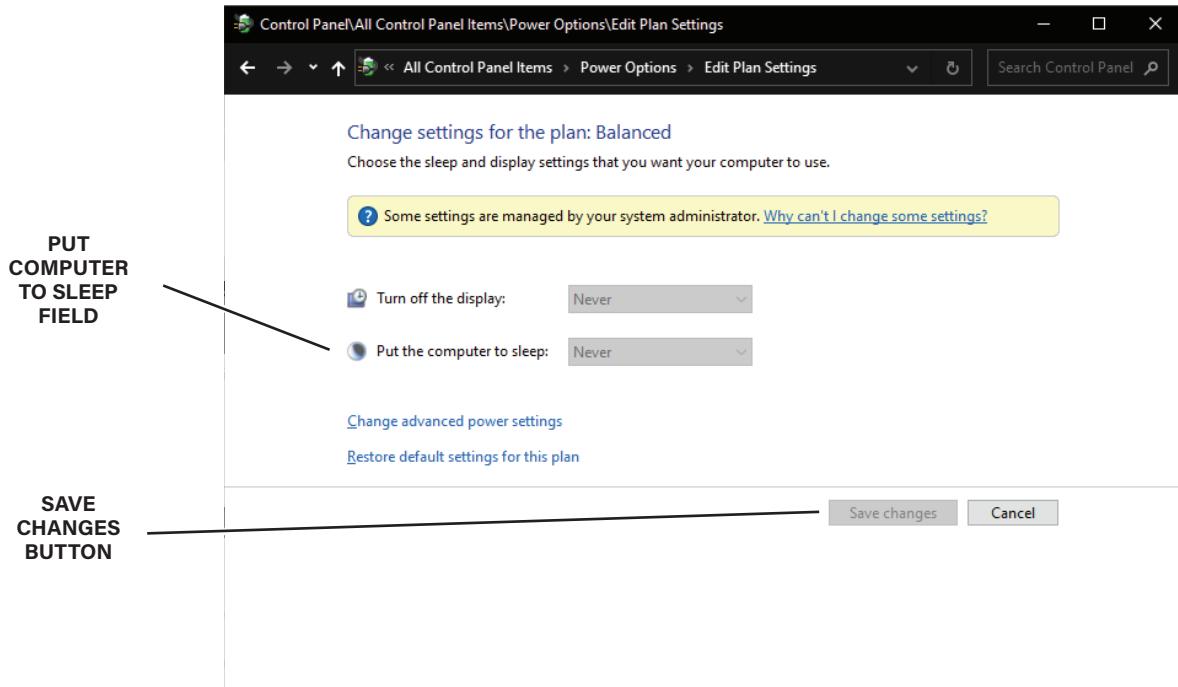


Figure 74. Power Options Properties

- F. Verify that the **Put the computer to sleep** field contains the **Never** option, as shown in figure 74. If not, click the drop list arrow and select the option from the list.  
The Turn off monitor and Turn off hard disks fields may contain any options you desire.
- G. Click **Save Changes** to apply your newly edited settings without closing the Power Options dialog.

- H. If using Windows 10/11 skip to the next section, otherwise if using Windows 7 then click the Hibernate tab on the Power Options Properties window.

The Hibernate tab will appear.

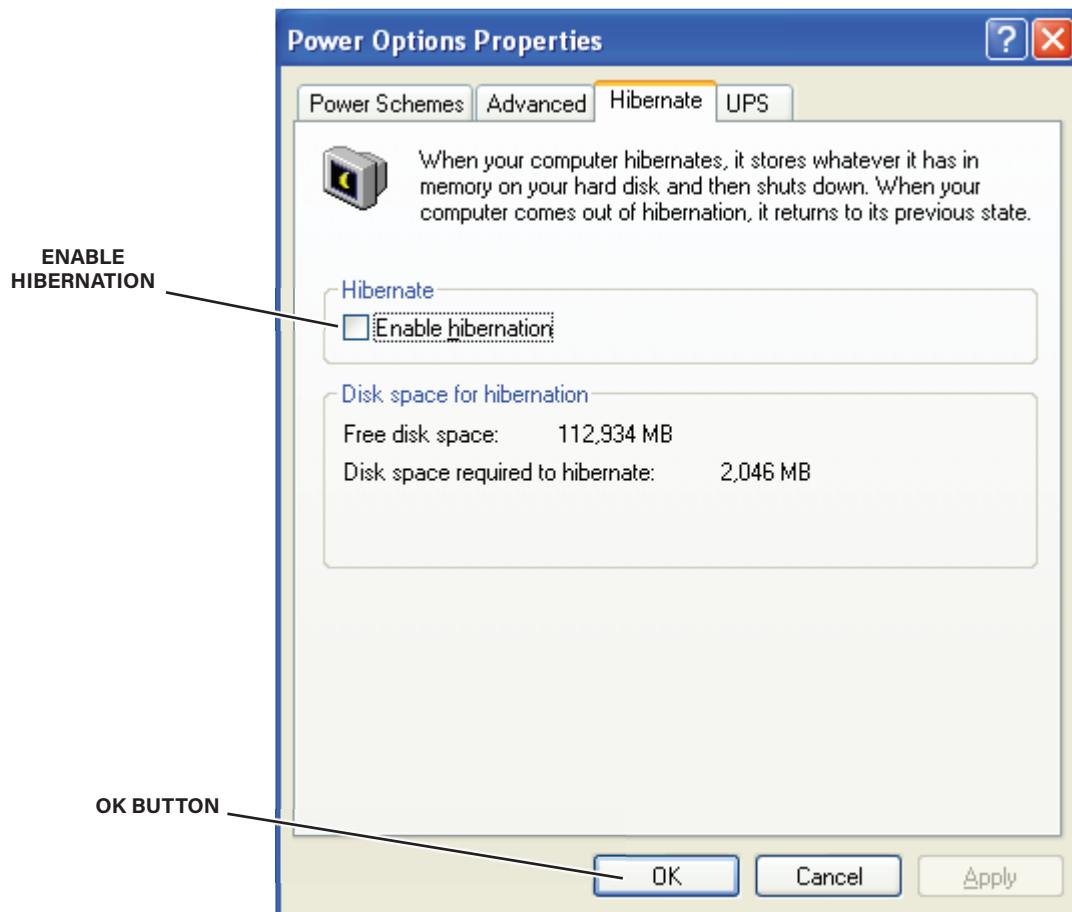


Figure 75. Hibernate Tab Displayed

- I. Verify that the Enable hibernation checkbox does not have a checkmark, as shown in figure 75. If it does, click the Enable Hibernation checkbox to remove (or deselect) the option.  
J. Click the **OK** button to accept your edits and close the Power Options Properties dialog.

The dialog will disappear from your screen.

**6.2****FAULTPRO STUDENT PROCEDURES**

FaultPro provides a student with an opportunity to practice their troubleshooting skills before they are actually tested. In the Single Fault mode, the student manually inserts the fault.

In the Random Fault mode, two options are available to the student. If the Practice option is selected, FaultPro randomly inserts faults from a pool of active faults for the student to troubleshoot. The student uses the Random Fault Mode Test option when ready to be tested. FaultPro randomly inserts faults into the system or workstation. The software tracks the student's progress and the results are stored either in a database on the instructor station (if networked) or on the individual stations (if not networked).

The following steps are provided to the instructor as a guide on how to use FaultPro in the Single or Random Fault mode. All Amatrol's workstation(s) or system(s) that use FaultPro software have instructions in the LAP's troubleshooting skills for the student.

**6.21 Using the Single Fault Mode**

1. Perform the following substeps to log into the FaultPro Student Software.
  - A. Locate and then double-click the **FaultPro\_Student** icon to start the FaultPro Student software.



Figure 76. FaultPro Student Software Icon

The FaultPro Student Software Log in screen will appear.



Figure 77. FaultPro Student Software Log In Screen

B. Log in using your Student ID and Password.

If you do not have a Student ID and Password, you may wish to create one and add it to one of your class rosters (see section 5.3). The Student Options Menu should appear similar to that shown in figure 78.

The Student Options Menu displays a class object for every class in which the student is enrolled. The Class object contains the fault template for the class and is organized by LAP and Skill.

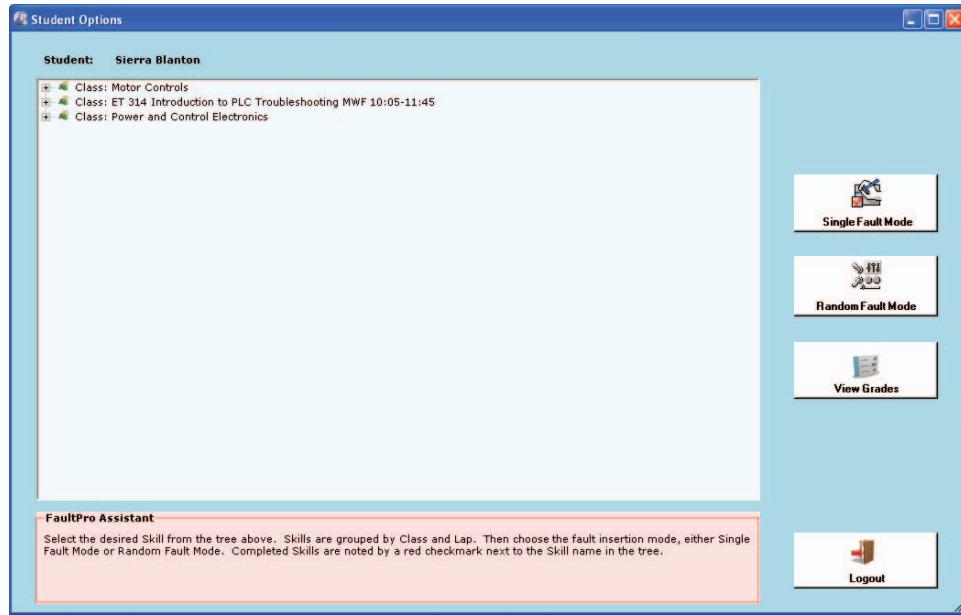


Figure 78. Student Options Menu

2. Perform the following substeps to insert a fault into the system using the Single Fault mode.

The Single Fault mode enables students to insert faults into their workstation manually, in accordance with the instructions provided in their learning system materials. Doing this enables students to observe the fault and the symptoms that it produces, and, to troubleshoot the faulted system in a curriculum-guided manner.

- A. Select the plus sign [+] next to the Class in which you are currently sitting/working to expand the class object and display its contents, as shown in figure 79.

The class should expand to display a listing of LAPs.

- B. Select the plus sign [+] next to the LAP number/title that matches the one that you are currently working with to display its skills, also shown in figure 79.

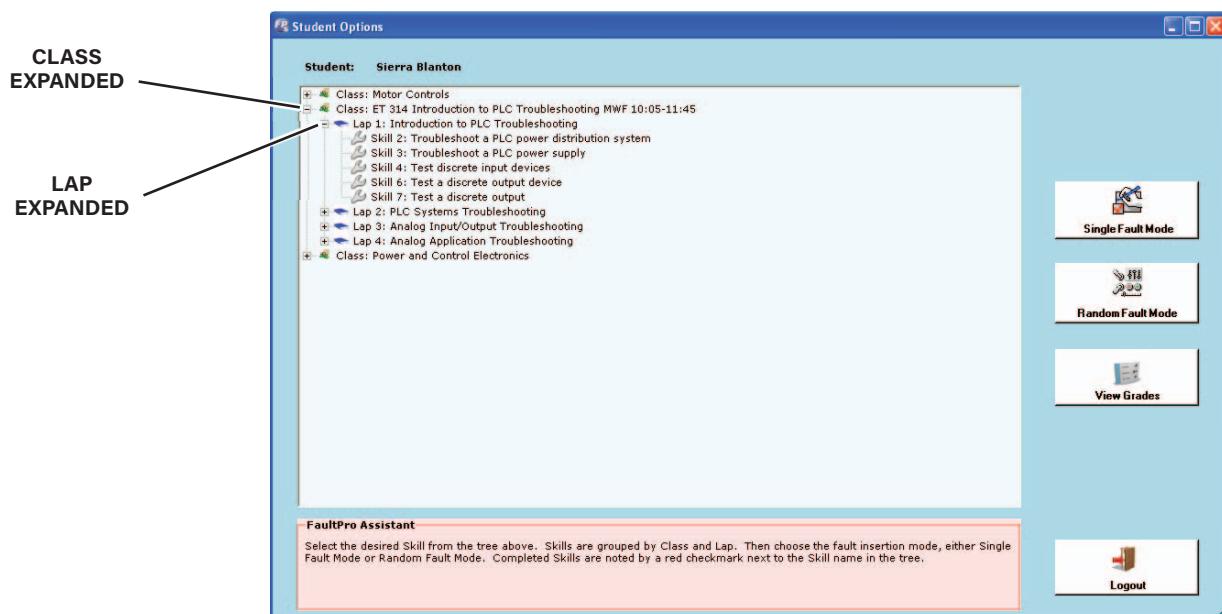


Figure 79. LAP Object Expanded

C. Click the Skill number/title matching the one that you are currently working with.

A checkmark should appear next to the selected Skill, replacing the icon that was previously there.

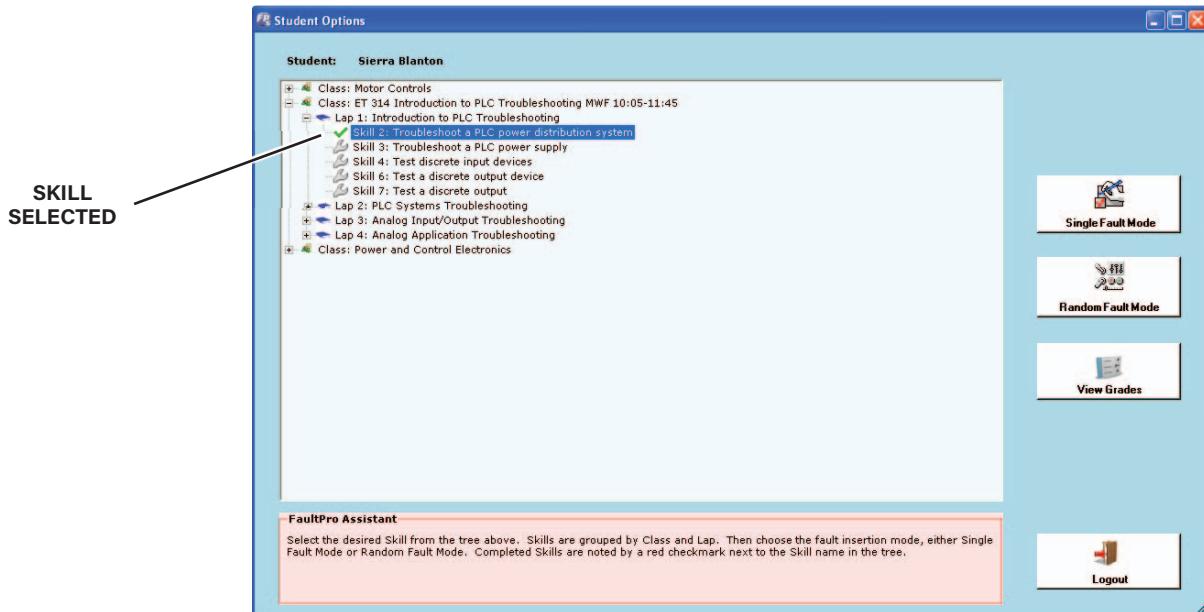


Figure 80. Skill Selected

D. Click the **Single Fault Mode** button.

The Single Fault Mode dialog should appear on the screen.

This dialog enables the user to insert faults into the system. The dialog contains a hardware drop list (in the event the selected skill contains more than one type/category of faults), a fault entry field, an Enter button, a Clear Fault button, and an Exit button. The dialog also has a FaultPro Assistant area providing instructions on how to use the dialog to activate a fault.

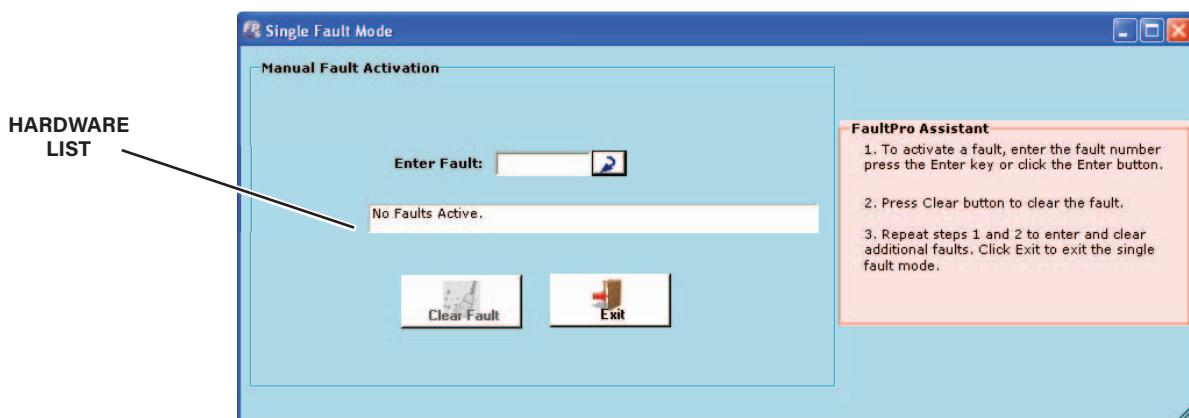


Figure 81. Single Fault Mode

- E. Select the hardware in which you wish to enter a fault (if applicable) and then press the **Tab** key.  
 The selected hardware will appear in the field and the cursor appears in the Fault Entry field.
- F. Type the number corresponding to the Fault that you wish (or are instructed) to insert into the workstation hardware and then press [Enter].  
 The fault is inserted into the workstation and the dialog's status field indicates that the fault is active.

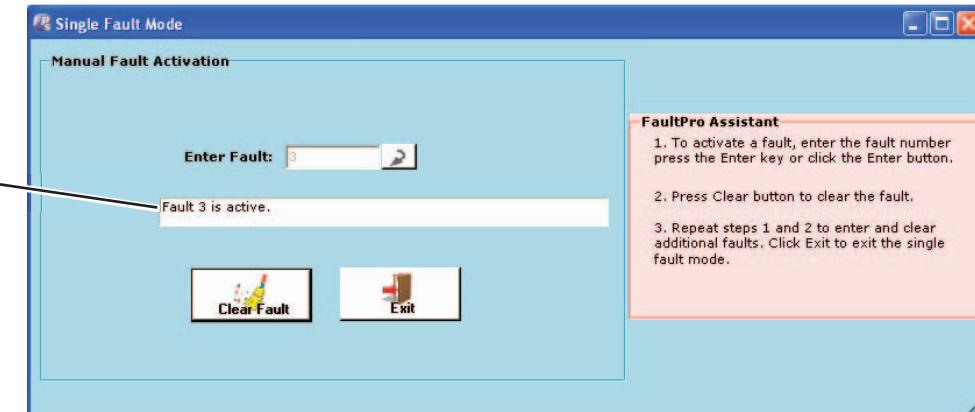


Figure 82. Fault 3 is Active

- G. Investigate the status of the fault and verify that the fault has occurred using the procedure specified in the LAP.
3. Click the **Clear Fault** button to remove the fault from the hardware.  
 The fault is removed and the dialog's status field updates to indicate that the Fault is cleared. In some cases, you will need to perform additional steps to return the workstation to working order. An example of this would occur when inserted faults involve a workstation's power circuits. In these cases, the MCR circuit must often be restored to return control power to the workstation.

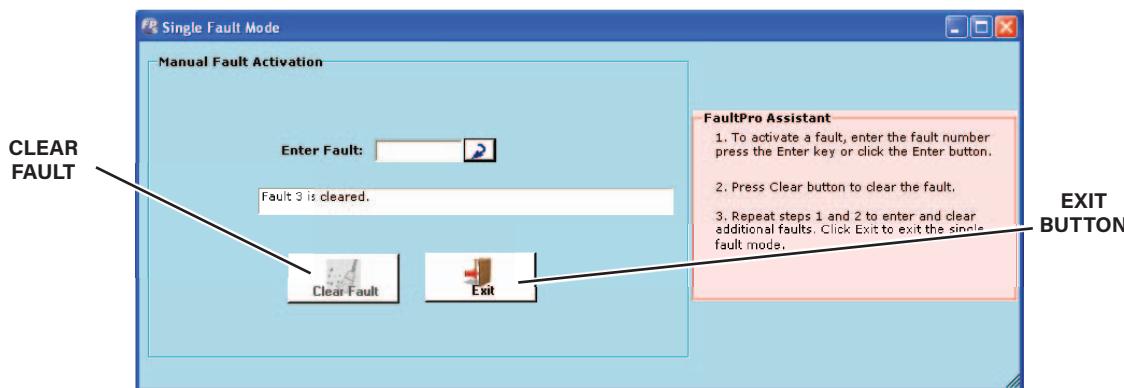


Figure 83. Fault Cleared

4. Click the **Exit** button to exit the single fault mode and return to the Student Options Menu.
5. Click the **Log Out** button to exit the student interface and return to the Student Login screen.

The Login Screen will appear.



Figure 84. Login Screen

6. Click the **Exit** button to exit the FaultPro Student software.

## 6.22 Using the Random Fault Practice Mode

1. Perform the following substeps to log into the FaultPro Student Software.
  - A. Locate and then double-click the **FaultPro\_Student** icon to start the FaultPro Student software.



Figure 85. FaultPro Student Software Icon

The FaultPro Student Software Log in screen will appear.



Figure 86. FaultPro Student Software Log In Screen

**B. Log in using your Student ID and Password.**

If you do not have a Student ID and Password, you may wish to create one and add it to one of your class rosters.

The Student Options Menu should appear similar to that shown in figure 87.

The Student Options Menu displays a class object for every class in which the student is enrolled. The Class object contains the fault template for the class and is organized by LAP and Skill.



Figure 87. Student Options Menu

2. Perform the following substeps to insert a fault into the system using the Random Fault-Practice Mode.

The Random Fault-Practice Mode inserts faults into the workstation (one at a time) providing students the ability to practice and improve their troubleshooting skills without assessment. .

- A. Select the plus sign [+] next to the Class in which you are currently sitting/working to expand the class object and display its contents, as shown in figure 88.  
The class should expand to display a listing of LAPs.
- B. Select the plus sign [+] next to the LAP number/title that matches the one that you are currently working with to display its skills, also shown in figure 88.

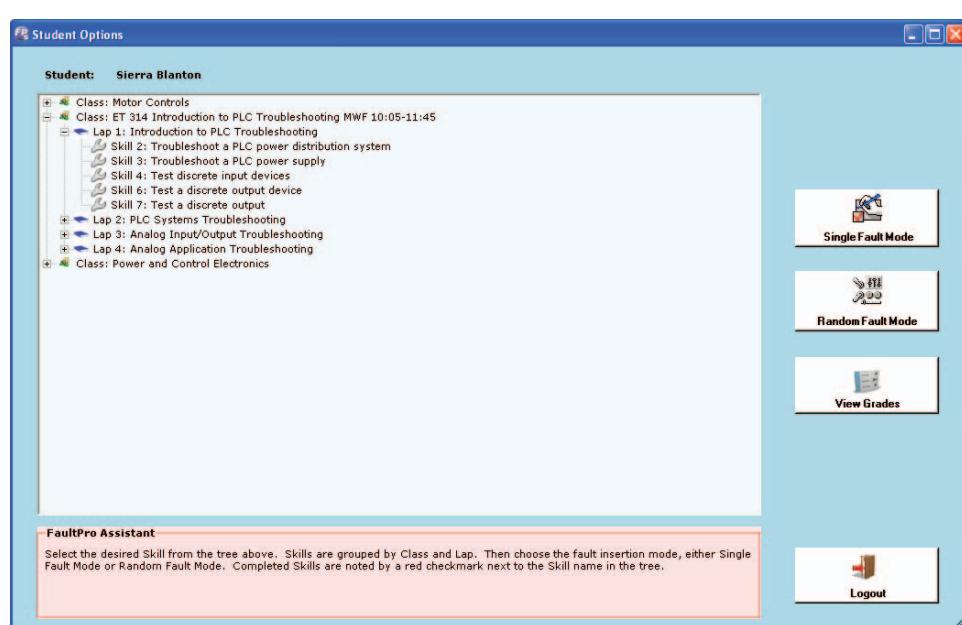


Figure 88. LAP Object Expanded

- B. Click the **Skill** number/title matching the one that you are currently working with.

A checkmark should appear next to the selected Skill, replacing the icon that was previously there.

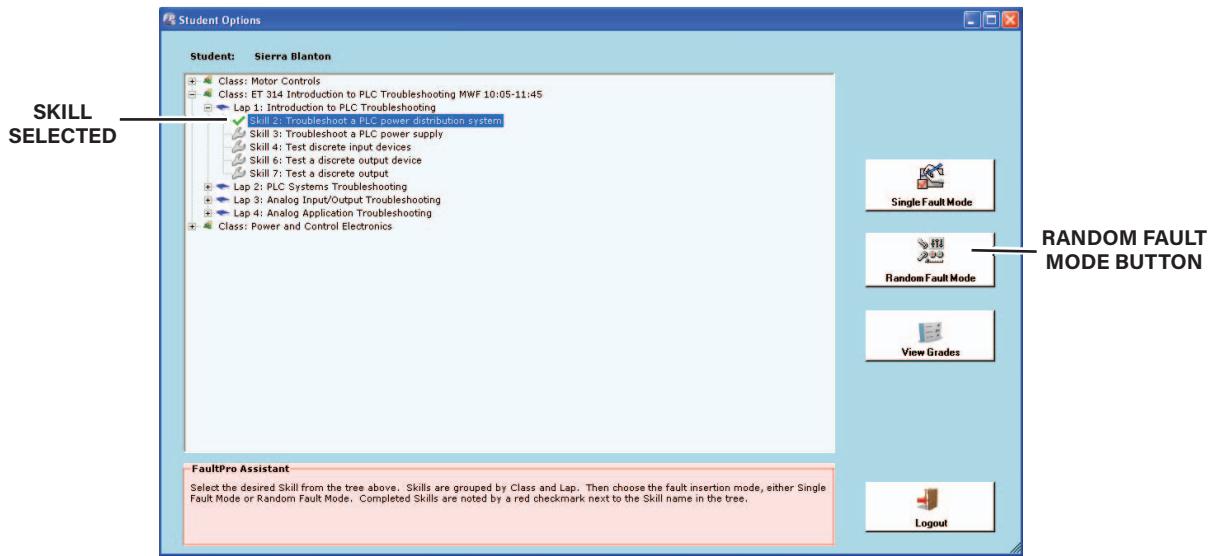


Figure 89. Skill Selected

- C. Click the **Random Fault Mode** button.

The Random Fault Mode Options dialog should appear on the screen.

This dialog enables the user to select between two modes of operation, Practice and Test.

**Practice mode** - The Practice mode provides students an opportunity to practice their troubleshooting skills by inserting faults into the workstation (one at a time) and allowing the student to troubleshoot the faults without being tested.

**Test mode** - The Test Mode serves to assess a student's troubleshooting skills by inserting faults into the workstation (one at a time) and tracking the amount of time, and number of attempts that a student uses to identify the inserted fault.

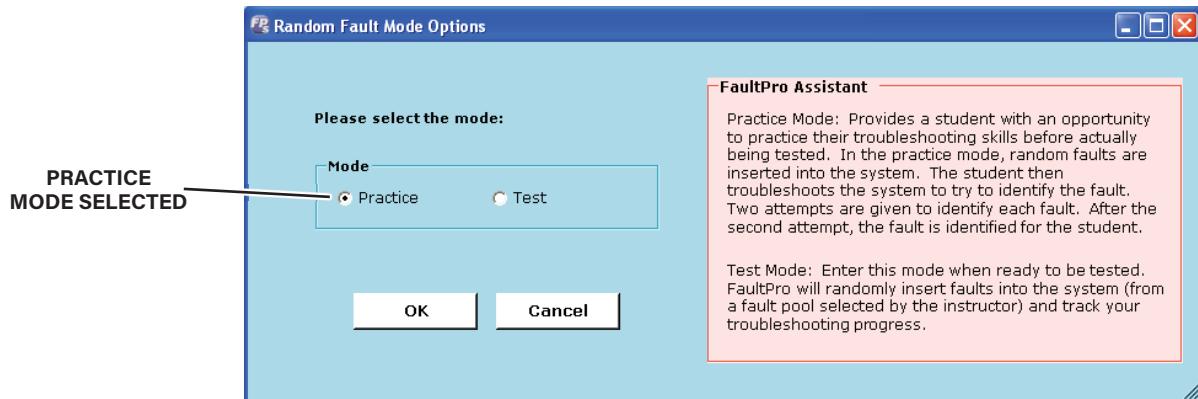


Figure 90. Random Fault Mode Options Dialog

- D. Verify that the **Practice Mode** radio is selected and then press the **Enter** key (or click **OK**).

The Random Fault-Practice Mode dialog appears on your screen. The dialog provides User and Skill information, troubleshooting statistics, and a reference that correlates faults with their respective fault numbers.

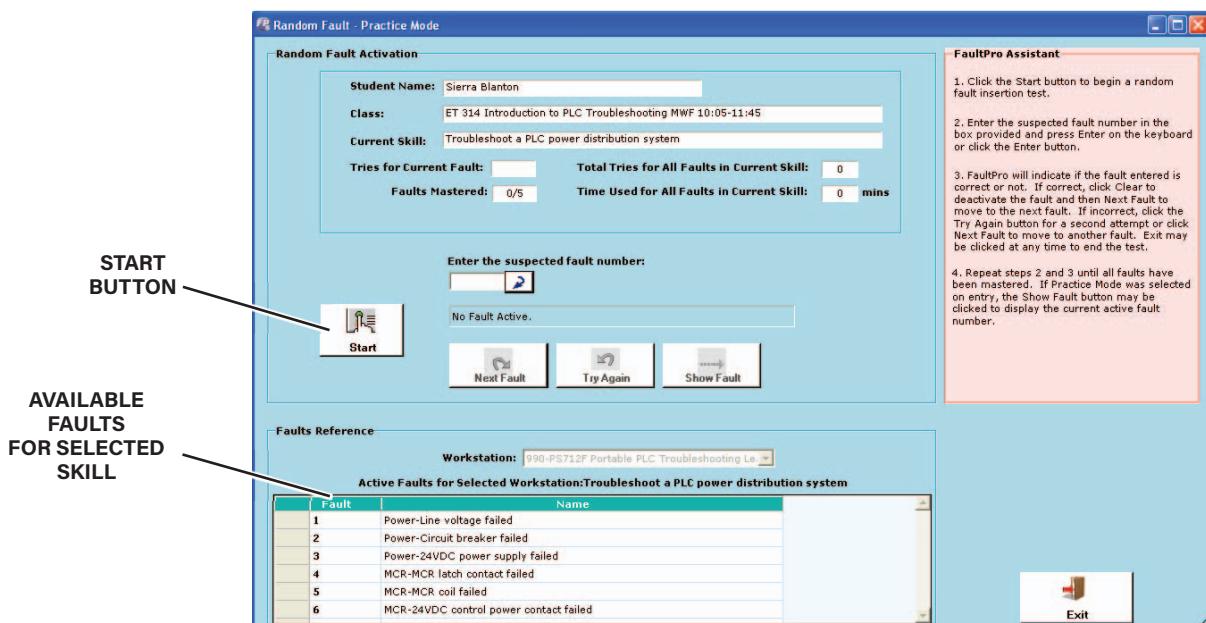


Figure 91. Random Fault-Practice Mode Dialog

- E. Click the **Start** button to initiate fault insertion.

A fault is inserted into the workstation and the software prompts you to enter the fault number (a blinking cursor appears in the **Enter the suspected fault number** field).

For this exercise, the possible faults are assigned numbers in the Available Faults for Selected Skill scroll box, located at the bottom of the dialog.

- F. Troubleshoot the workstation using the Troubleshooting Flowchart(s) provided with your learning system.
- G. Type the number of the suspected fault (referenced in the Available Faults for Selected Skill scroll box) and press Enter (or click the Enter button on the Random Fault dialog).
- If your answer is correct, the dialog's Status field will indicate, "Answer is Correct."

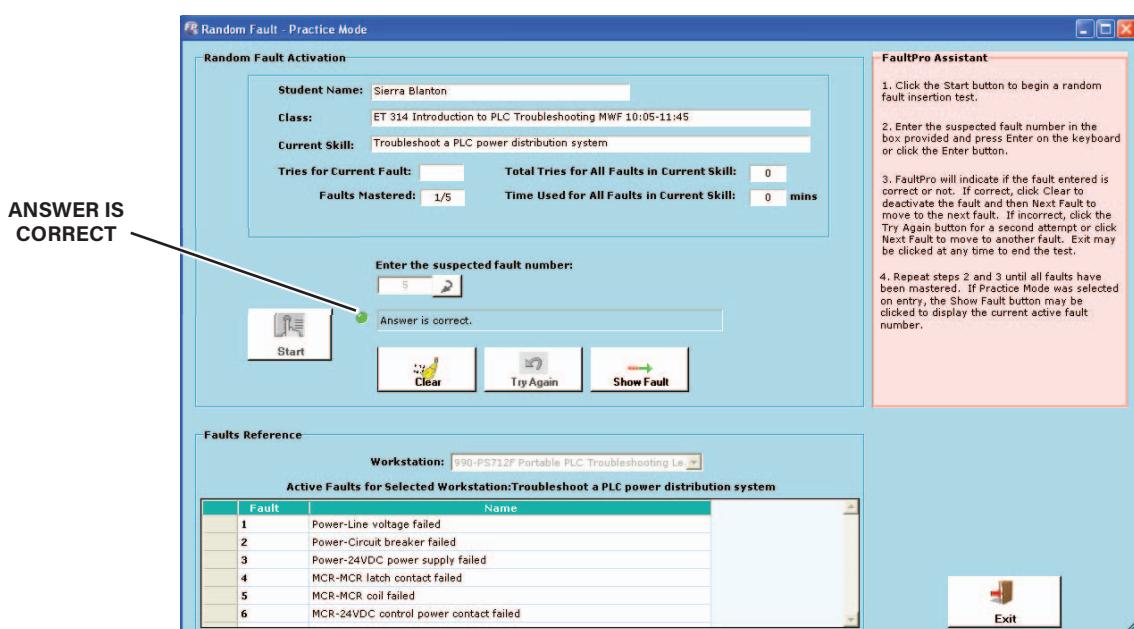


Figure 92. Answer Is Correct

If your answer is not correct, the dialog's Status field will indicate, "Answer is not correct."

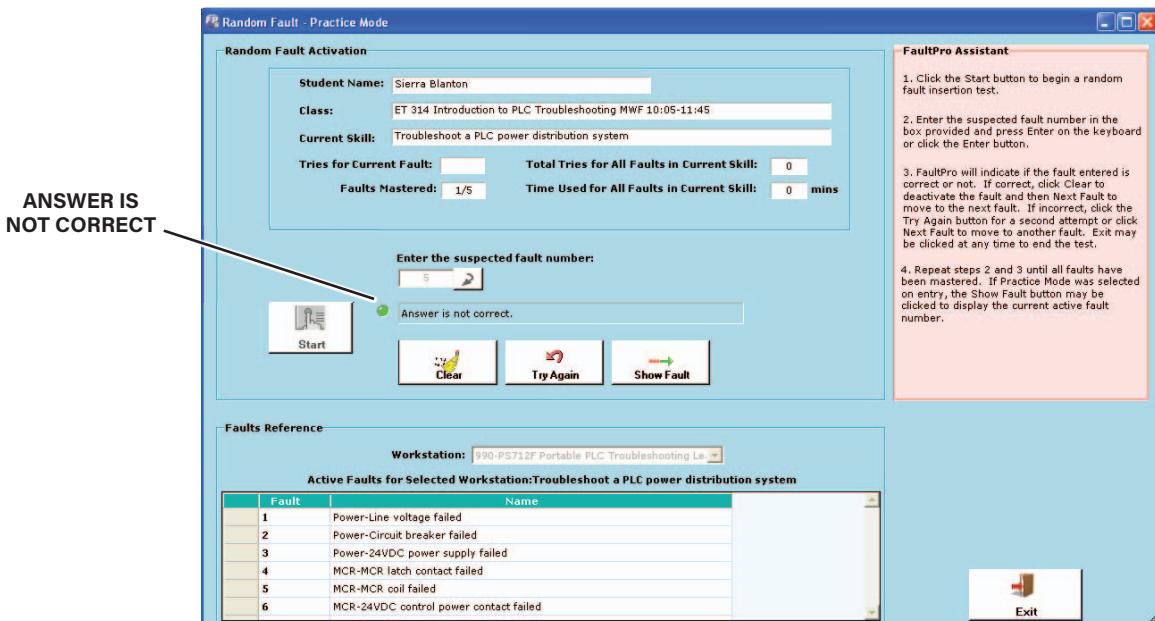


Figure 93. Answer Is Not Correct

If your answer is not correct, you can: 1) click the **Try Again** button to try to troubleshoot the current fault again, at which point you would repeat substeps F through G to attempt to troubleshoot again, 2) click the **Next Fault** button, to continue to the next fault, or 3) click the **Show Fault** button to display the number of the current fault.

- H. Click **Clear** and then **Next Fault** to continue to the next fault.
- The fault insertion system inserts another fault in its place (as long as faults remain in the template). In some cases, you will need to perform additional steps to return the workstation to working order. An example of this occurs when inserted faults involve a workstation's power circuits. In these cases, the MCR circuit must often be restored to return control power to the workstation.
- I. Repeat substeps F through H to troubleshoot all faults in the template. In the practice mode, the system will allow you to continue with practice. When all faults have been mastered, the status field will indicate "No faults left."
3. Click the **Exit** button to exit the Random Fault dialog and return to the Student Options menu.
4. Click the **Log Out** button to exit the student interface and return to the Student Login screen.

The Login Screen will appear.



Figure 94. Login Screen

5. Click the **Exit** button to exit the FaultPro Student software.

## 6.23 Using the Random Fault Test Mode

1. Perform the following substeps to log into the FaultPro Student Software.
  - A. Locate and then double-click the FaultPro\_Student Icon to start the FaultPro Student software.



Figure 95. FaultPro Student Software Icon

The FaultPro Student Software Log in screen will appear.



Figure 96. FaultPro Student Software Log In Screen

- B. Log in using your Student ID and Password.

If you do not have a Student ID and Password, you may wish to create one and add it to one of your class rosters.

The Student Options Menu should appear similar to that shown in figure 97.

The Student Options Menu displays a class object for every class in which the student is enrolled. The Class object contains the fault template for the class and is organized by LAP and Skill.



Figure 97. Student Options Menu

2. Perform the following substeps to insert a fault into the system using the Random Fault-Test Mode.

The Random Fault-Test Mode inserts faults into the workstation (one at a time) providing students the ability to assess their troubleshooting skills.

- A. Select the plus sign [+] next to the Class in which you are currently sitting/working to expand the class object and display its contents, as shown in figure 98.
- The class should expand to display a listing of LAPs.
- B. Select the plus sign [+] next to the LAP number/title that matches the one that you are currently working with to display its skills, also shown in figure 98.



Figure 98. LAP Object Expanded

- B. Click the **Skill** number/title matching the one that you are currently working with.

A checkmark should appear next to the selected Skill, replacing the icon that was previously there.

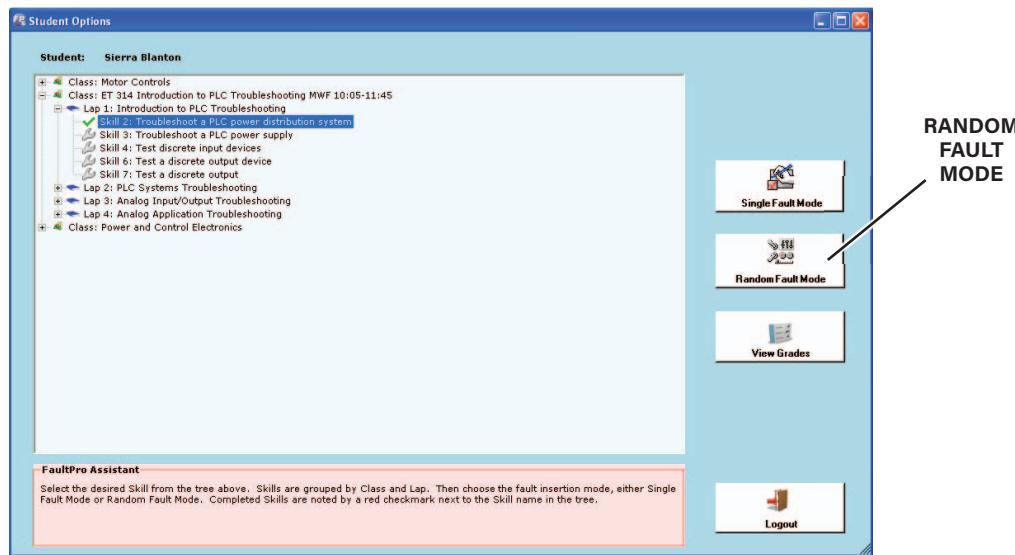


Figure 99. Skill Selected

- C. Click the **Random Fault Mode** button.

The Random Fault Mode Options dialog should appear on the screen.

This dialog enables the user to select between two modes of operation, Practice and Test.

**Practice mode** - The Practice Mode provides students an opportunity to practice their troubleshooting skills by inserting faults into the workstation (one at a time) and allowing the student to troubleshoot the faults without being tested.

**Test mode** - The Test Mode serves to assess a student's troubleshooting skills by inserting faults into the workstation (one at a time) and tracking the amount of time, and number of attempts that a student uses to identify the inserted fault.

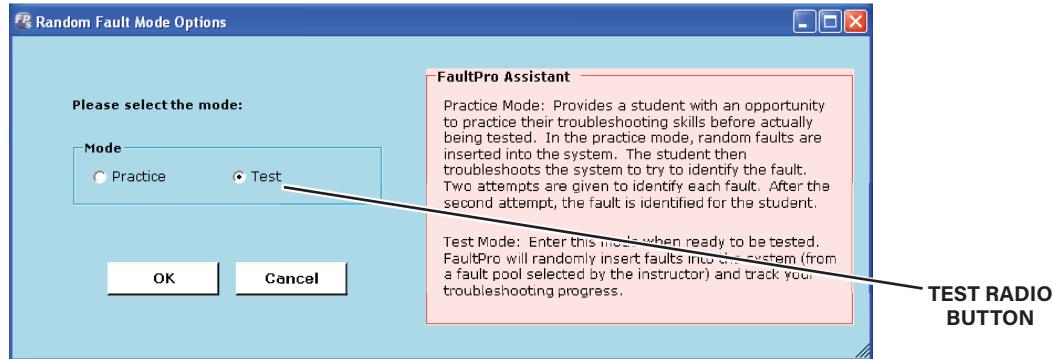


Figure 100. Random Fault Mode Options Dialog

**D. Click the **Test** radio button and click **OK**.**

The Random Fault-Test Mode dialog appears on your screen. The dialog provides User and Skill information, troubleshooting statistics, and a reference that correlates faults with their respective fault numbers.

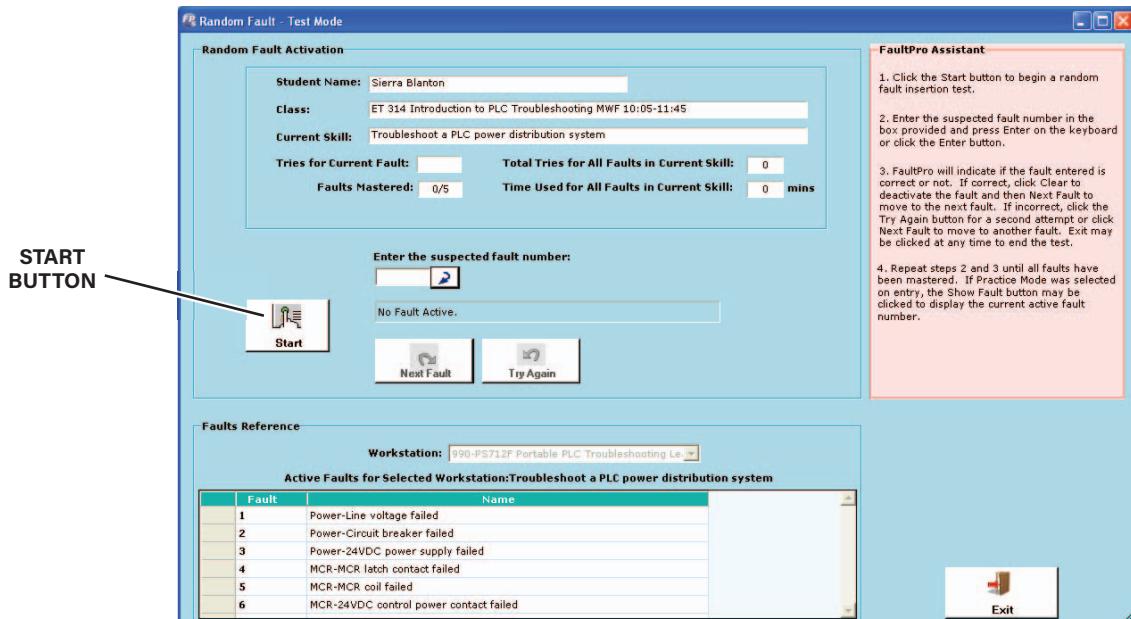


Figure 101. Random Fault-Test Mode Dialog

**E. Click the **Start** button to initiate fault insertion.**

A fault is inserted into the workstation and the software prompts you to enter the fault number (a blinking cursor appears in the Enter the suspected fault number field).

For this exercise, the possible faults are assigned numbers in the Available Faults for Selected Skill scroll box, located at the bottom of the dialog.

**F. Troubleshoot the workstation using the Troubleshooting Flowchart(s) provided with your learning system.**

- G. Type the number of the suspected fault (referenced in the Available Faults for Selected Skill scroll box) and press Enter on the keyboard (or click the Enter button on the Random Fault dialog).

If your answer is correct, the dialog's Status field will indicate "Answer is Correct," and the troubleshooting statistics area is updated.

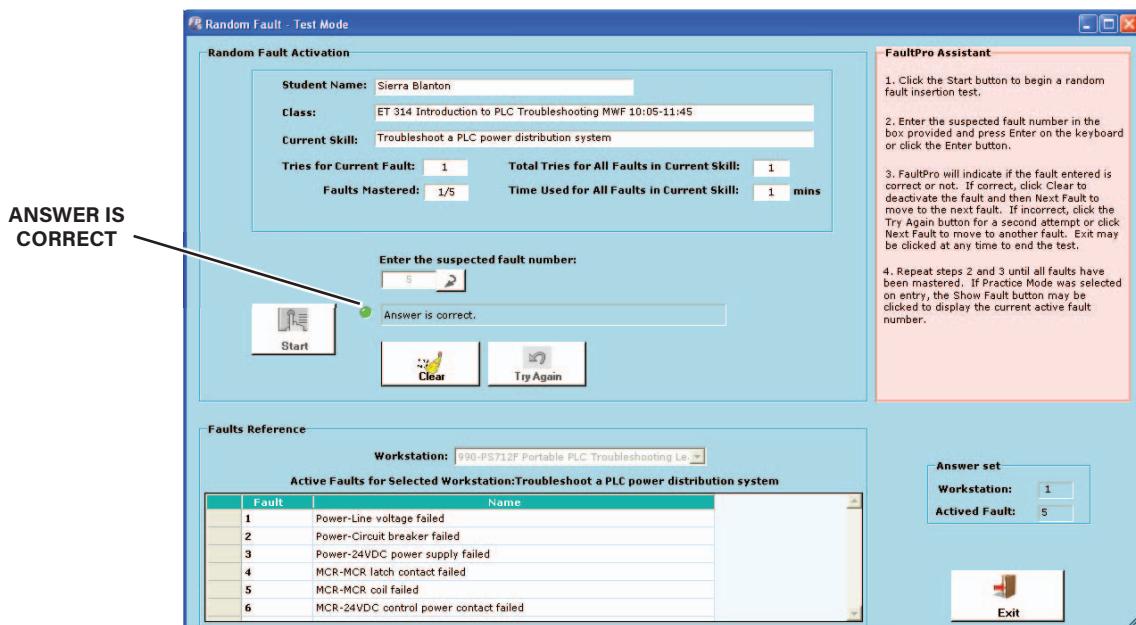


Figure 102. Answer Is Correct

If your answer is not correct, the dialog's Status field will indicate, "Answer is not correct."

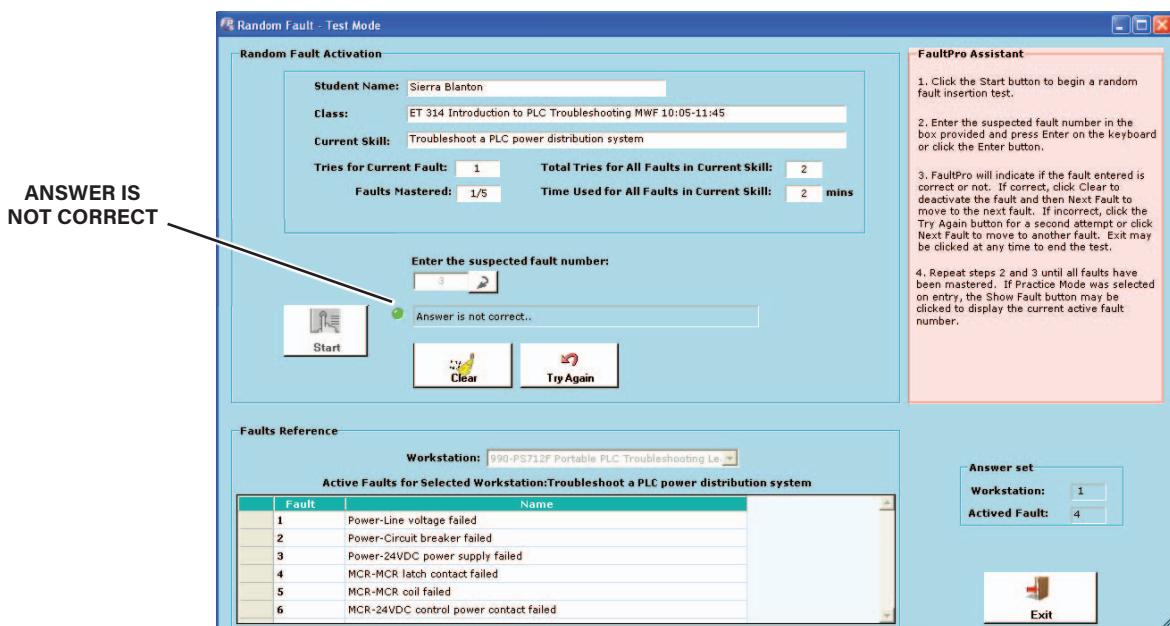


Figure 103. Answer Is Not Correct

If your answer is not correct, you can 1) click the **Try Again** button to try to troubleshoot the current fault again, at which point you would repeat substeps F and G to attempt to troubleshoot again, or, 2) click the **Next Fault** button to continue to the next fault.

- H. Click **Clear** then **Next Fault** button to continue to the next fault.

The fault insertion system inserts another fault in its place (as long as faults remain in the template). In some cases, you will need to perform additional steps to return the workstation to working order. An example of this occurs when inserted faults involve a workstation's power circuits. In these cases, the MCR circuit must often be restored to return control power to the workstation.

- I. Repeat substeps F through G to troubleshoot all faults in the template. When all faults have been mastered, the status field will indicate "No faults left."
3. Click the **Exit** button to exit the Random Fault dialog and return to the Student Options menu.
4. Click the **Log Out** button to exit the student interface and return to the Student Login screen.

The Login Screen will appear.



Figure 104. Login Screen

5. Click the **Exit** button to exit the FaultPro Student software.

## 6.3

## VIEWING AND PRINTING GRADES/REPORTS

The View Assessment Screen, navigable from the Instructor Options Screen, enables instructors to sort, view, print, and export student and class assessment results for analysis or documentation.

Instruction for displaying and manipulating the View Assessment Screen are provided as follows:

1. Log into FaultPro using your ID and password.
2. From the **Instructor Options** screen, click **Assessment** to display the View Assessment Screen.

A dialog will appear briefly indicating "Please wait. FaultPro is loading the assessment data, followed by the View Assessment screen, shown in figure 105. By default, the screen will generate a Skills Report for the first Class listed in the Classes dropdown, identified in figure 105.

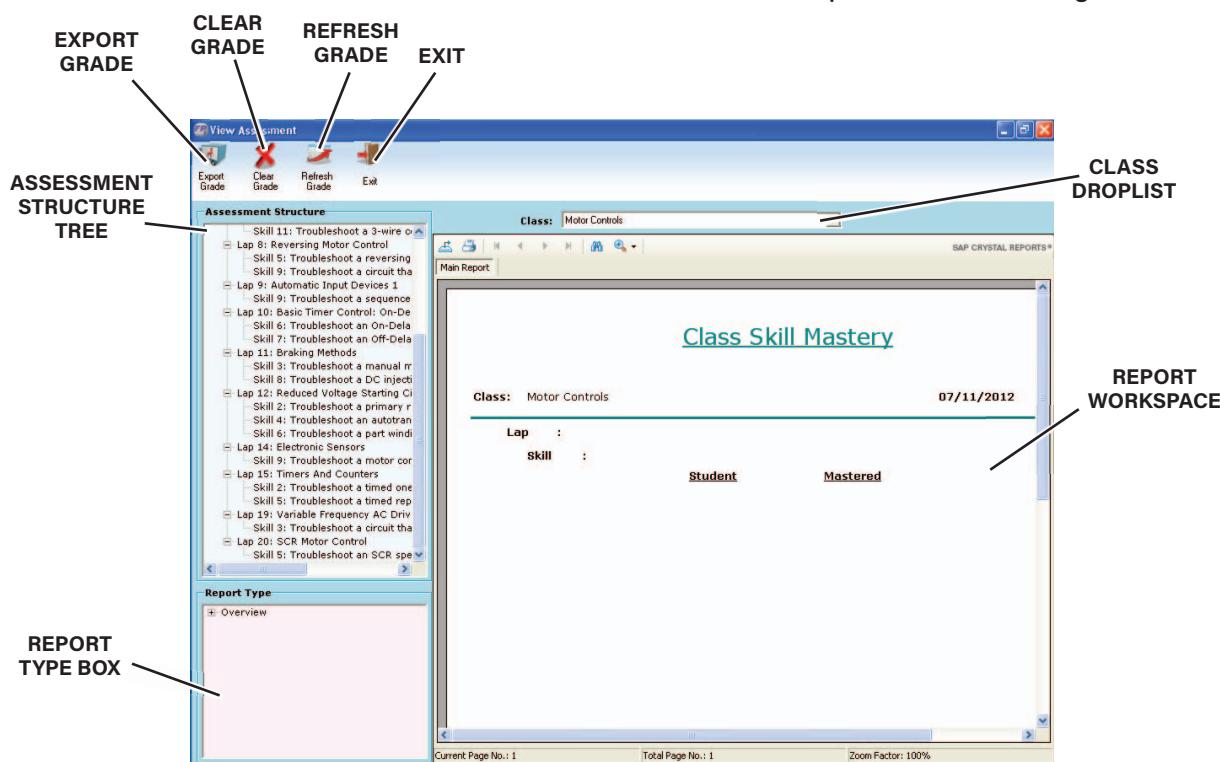


Figure 105. View Assessment Screen

3. Take a moment to familiarize yourself with the screen

The screen is broken into several areas including a tool bar, Assessment Structure Report Type and Report workspace. Each of these areas are described in more detail in the following paragraphs.

- **Classes dropdown** - The classes dropdown, shown in figure 114, defines the class for which reports will be generated.
- **Tool bar** - The toolbar provides four buttons that enable the instructor to Export Grades, Clear Grades, Refresh Grades, and Exit the View Assessment Screen.
  - **Export Grades button** - This button enables the user to export assessment data , for the currently selected class, for use in text or spreadsheet editing software. Exported data files are saved to a user-defined location in the .CSV (comma separated value) file format.
  - **Clear Grade button** - This button enables the user to clear the assessment results for the currently selected class and skill (as defined by the Assessment Structure tree).
  - **Refresh Grade button** - This button enables the instructor to refresh, or update, report data results while class is in session.
  - **Exit** - The Exit button enables the user to return to the Instructor Options screen.
- **Assessment Structure tree** - This tree represents the Fault template for class defined in the Classes dropdown. It is also used in combination with the Clear Grade button to define the skill whose grade you wish to clear.
- **Report Type listbox** - The Report Type listbox is used to define the presentation of assessment results and data. Expanding the listbox allows the user to display and select the report option that you wish to employ for the currently selected class data. Depending upon the grading method used for the class, some options will appear greyed. Report options include:
  - **Skills Report by Class** - This report displays the numeric assessment results for all students enrolled in the class on a skill-by-skill basis.
  - **Skills Report by Student** - This report displays the numerical assessment results for an instructor-defined student on a skill-by-skill basis. Selecting Skills Report by Student option displays a Student dropdown. The student dropdown contains a listing of every student enrolled in the class and is used to define the student for which report data will be generated.
  - **Skill Mastery by Class** - This report displays the skill mastery results for all students enrolled in the class on a skill-by-skill basis.
  - **Skill Mastery by Student** - This report displays the skill mastery results for an instructor-defined student on a skill-by-skill basis. Selecting Skills Report by Student option displays a Student dropdown. The student dropdown contains a listing of every student enrolled in the class and is used to define the student for which report data will be generated.

- **Fault Detail by Class** - This selection generates a report displaying the numeric assessment results of every student, for every fault (for every skill) in the selected class.
- **Fault Detail by Student** - This selection generates a report displaying the numeric assessment results of a selected student, for every fault in the selected class. Selecting the Fault Detail by Student option displays a Student dropdown. The student dropdown contains a listing of every student enrolled in the class and is used to define the student for which report data will be generated.
- **Report workspace** - The report workspace displays the report for the selected Class and Report Type. It also provides several tools buttons used to Export, Print, navigate, Search and resize the report.

The remaining steps of this section illustrate the steps required to configure, display and print out a Fault Detail by Student report, as might be included in a student's assessment portfolio. Other reports would be generated similarly.

4. Perform the following substeps to configure, display and print out a report providing Fault Detail by Student.

- A. Click the **Class:** dropdown to display a listing of your classes.
- B. Select the Class in which the student is enrolled.

The dropdown will close and the selected class will appear in the dialog. In this example, the ET 314 Introduction to PLC Troubleshooting Class has been selected.

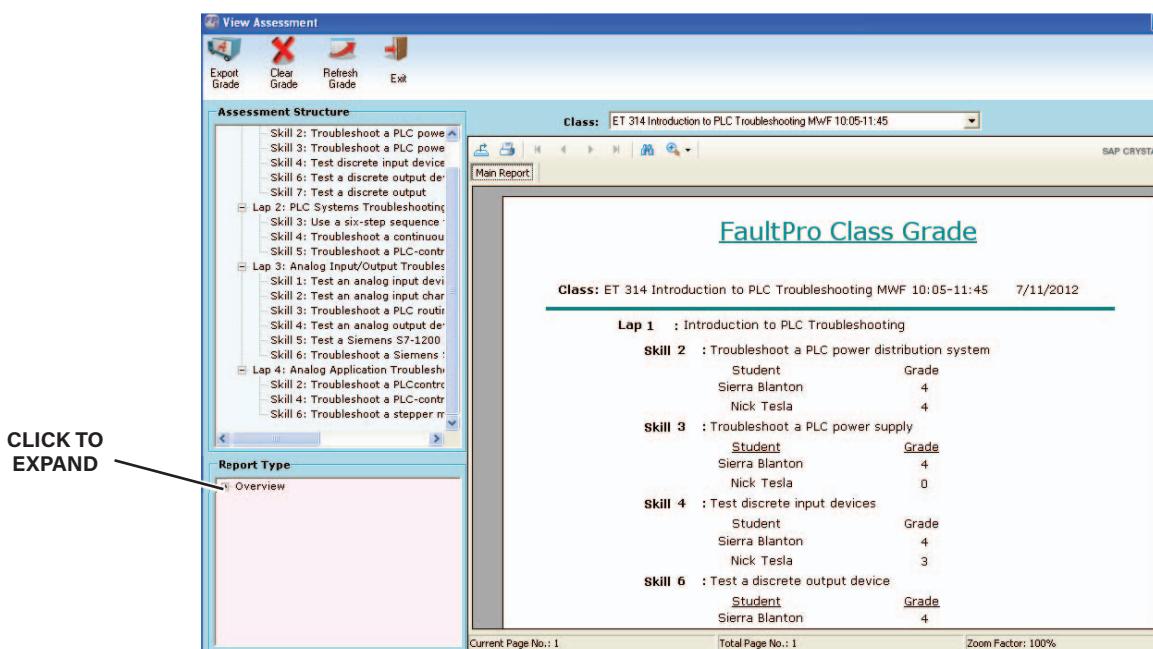


Figure 106. Select Class from the Class Dropdown

- C. Click the [+] sign, located in the **Report Type** listbox to display its options.

The Report Type list will expand to display its options.

- D. Select the report type that you wish to generate. In this case, **Fault Detail by Student**, to select the report option.

The Student listbox will appear on the screen, similar to that shown in figure 107.

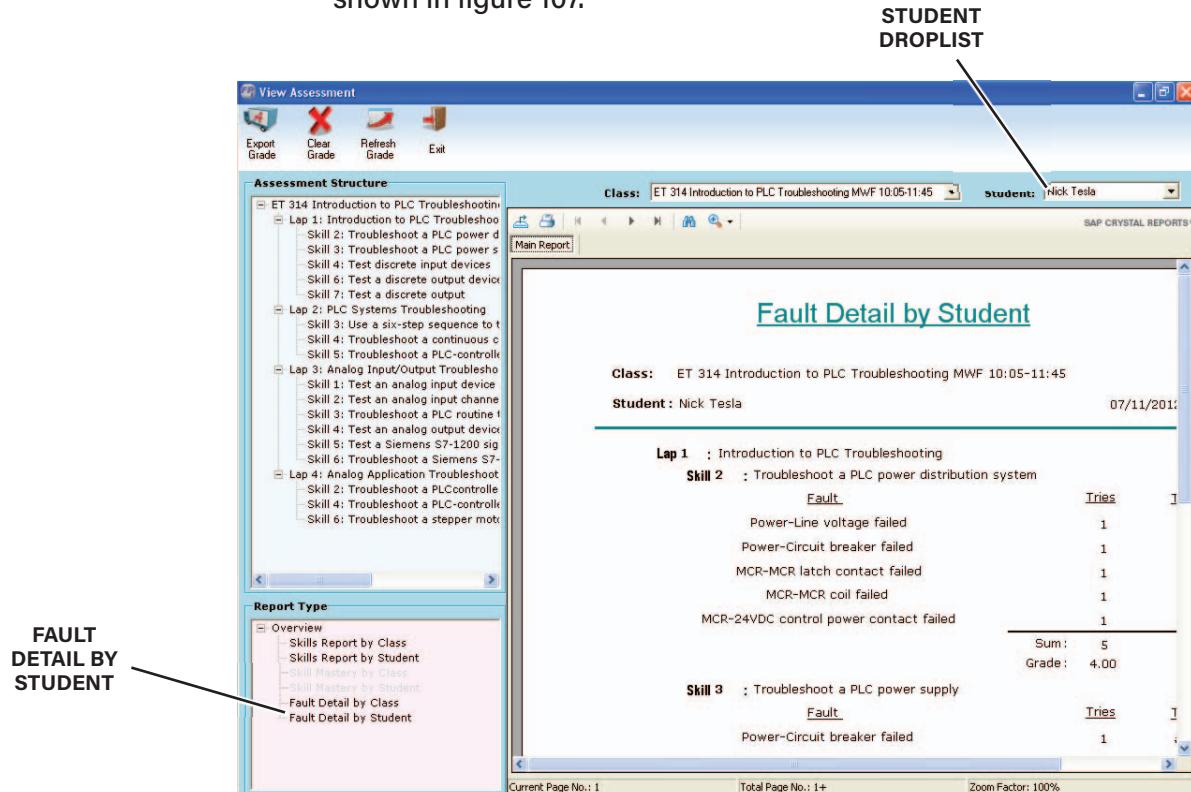


Figure 107. Fault Detail By Student Report Selected, Student Droplist Now Displayed

- E. Click the **Student droplist** to display a listing of students enrolled in the class.

- F. Select the **Student** upon which you wish to generate a skills report.

The Student will appear selected in the Student: field and a report detailing the student's assessment results will appear in the Report Workspace.

- G. Click the **Print** icon, located at the top of the Report Workspace to print out a hardcopy of the report.