

# DETAILED CEU COURSE DESCRIPTION

## PUMPS 202 CEU TRAINING COURSE – 20 HOURS

This distance learning CEU training course will examine commonly found conventional water/well/wastewater/collection lift station fluid pumping methods, and related motor and components. This course was designed to provide continuing education credit to water and/ or wastewater treatment/onsite operators and well drillers.

### Course Purpose

The main purpose of this course is to provide continuing education in understanding various water lifting procedures, basic pump fundamentals, hydraulic principles, theory, maintenance, related electrical and motor principles.

### Target Audience

**Water Distribution, Well Drillers, Pump Installers, Water Treatment Operators, Wastewater Treatment Operators, Wastewater Collection Operators, Industrial Wastewater Operators and General Backflow Assembly Testers.** The target audience for this course is the person interested in working in a water or wastewater treatment or distribution/collection facility and/or wishing to maintain CEUs for certification license or to learn how to do the job safely and effectively, and/or to meet education needs for promotion. There are no prerequisites, and no other materials are needed for this course.

### Course Statement of Need

All water and wastewater operators who work with pumps/motors need to be able to describe proper basic pump principles and/ maintenance procedures and properly demonstrate proper and safe operation, maintenance and theory of various pumps / motors.

### Prerequisite

Basic math and chemistry knowledge on at a high school level is recommended for successful completion of this course.

### General Course Learning Objectives

Section 1 - Fluid/Hydraulic Forces & Pressures  
Section 2 - Physical Science and Related Laws  
Section 3- Fluid Mechanics and Hydraulic Principles  
Section 4 - Experiments and Early Applications  
Section 5 - Hydraulic Foundations and Theories  
Section 6 –Pumps and Pumping Water  
Section 7 - Complicated Pumps  
Section 8- Pump Operation & Performance  
Section 9 - Motor-Pump Coupling Section  
Section 10- Electrical Motors  
Section 11 – SCADA

## **Primary Course Learning Objectives – Focus and Background**

### **Section 1 - Fluid/Hydraulic Forces & Pressures**

**Section Focus:** You will learn advanced fluid mechanics and hydraulic principle theories. At the end of this section, you the student will be able to understand and describe primary water mechanics and hydraulic theories and related components. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** In order to design hydraulic or water distribution systems or calculate pumping rates or flow rates, we need to master this area of engineering.

### **Section 2 - Physical Science and Related Laws**

**Section Focus:** You will learn the basics of hydraulic science, theories, laws and principles. At the end of this section, you the student will be able to understand and describe scientific laws relating to water and hydraulics. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** Fluid mechanics (water, hydraulics and hydrodynamics) entails many different scientific laws and theories. At the end of this section, you will understand and describe the properties of water, various laws of physics, examine thermodynamics and friction.

### **Section 3- Fluid Mechanics and Hydraulic Principles**

**Section Focus:** You will learn the basics of fluid mechanics and hydraulic principles. At the end of this section, you the student will be able to understand and describe primary water mechanics and hydraulic principles. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** In order to design flow rates, pumping system, calculate pump flows, we need to master this area of engineering.

### **Section 4 - Experiments and Early Applications**

**Section Focus:** You will learn the history of hydraulic principle theories and pumps. At the end of this section, you the student will be able to understand and describe simple hydraulic theories and the start of modern pumping principles. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** You will be able to understand and explain various and commonly found water/fluid mechanic related components and principles. In order to understand how pumps operate or to manufacture a simple pump or to calculate pumping raters or flow rates, we need to master this area of engineering.

### **Section 5 - Hydraulic Foundations and Theories**

**Section Focus:** You will learn the foundations of fluid mechanics and hydraulic principle theories. At the end of this section, you the student will be able to understand and describe early hydraulic scientists who founded hydraulic ideas. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** In order to design water systems or calculate pumping rates or flow rates, we need to master this area of engineering.

### **Section 6 –Pumps and Pumping Water**

**Section Focus:** You will learn the basics of various pumps. At the end of this section, you the student will be able to understand and describe water pumps and the associated hydraulic

principles. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** The main purpose of this section is to provide understanding of various water lifting procedures, basic pump fundamentals, hydraulic principles, theory, and maintenance.

### **Section 7 - Complicated Pumps**

**Section Focus:** You will learn the more about pumps, specifically, the complicated pumps. At the end of this section, you the student will be able to understand and describe types of complicated based on application and capabilities with a focus upon the two major groups of pumps are dynamic and positive displacement. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** Pump engineers, well drillers and many water operators work daily on various complicated water, or sludge pumps. This section is a continuation of the prior section.

### **Section 8- Pump Operation & Performance**

**Section Focus:** You will learn the basics of pump operation. At the end of this section, you the student will be able to understand and describe principles required to pump water. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** You also need to be aware of a pump's requirements i.e. various pumping head, net positive suction head, etc.

### **Section 9 - Motor-Pump Coupling Section**

**Section Focus:** You will learn the basics of motor to pump coupling. At the end of this section, you the student will be able to understand and describe various pump/motor connections and troubleshooting procedures. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** All motors and pumps have various and difficult methods or devices of connection and abilities to transfer electro-mechanical power. Motor-Pump alignment is the process of aligning shaft centerlines between a motor and a pump. The motor is the prime mover, transferring power to the pump by the use of a coupling.

### **Section 10- Electrical Motors**

**Section Focus:** You will learn the basics of an electric motor. At the end of this section, you the student will be able to understand and describe commonly found electrical motors used in water production. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** Electrical motors are common throughout the water/wastewater field. These motors require repair work from highly trained and skilled technicians.

### **Section 11 – SCADA**

**Section Focus:** You will learn the basics of the SCADA (or supervisory control and data acquisition) system. The student will be able to understand and describe the purpose of SCADA and the basic operation of SCADA systems. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

**Scope/Background:** Industrial organizations and companies in the public and private sectors to control and maintain efficiency, distribute data for smarter decisions, and communicate system issues to help mitigate downtime use SCADA systems.

## **Specific Learning Objectives**

### **Section 1- FLUID AND HYDRAULIC FORCES AND PRESSURES**

You will learn advanced fluid mechanics and hydraulic principle theories. At the end of this section, you the student will be able to understand and describe primary water mechanics and hydraulic theories and related components.

Key Terms

*Fluid/Hydraulic Principle Components & Theories- SCI &TECH & PE*

*Atmospheric Pressure- SCI &TECH & PE*

*Barometric Loop- SCI &TECH & PE &CC*

*Free Surface Perpendicular to Gravity- SCI &TECH & PE*

*Computing Force, Pressure, and Area- SCI &TECH & PE*

*Atmospheric Pressure and its Effects- SCI &TECH & PE*

*Vacuum- SCI &TECH & PE*

*Water Pressure- SCI &TECH & PE*

*Pressure and Force- SCI &TECH & PE*

*Post Quiz*

### **Section 2 – PHYSICAL SCIENCE AND RELATED LAWS**

You will learn the basics of hydraulic science, theories, laws and principles. At the end of this section, you the student will be able to understand and describe scientific laws relating to water and hydraulics.

Physical Science Key Terms- SCI &TECH & PE

Physical Science and Related Laws Introduction- SCI &TECH & PE

Newton's Laws- SCI &TECH & PE

Force- SCI &TECH & PE

Inertia- SCI &TECH & PE

Mass- SCI &TECH & PE

The Hypothesis of Force- SCI &TECH & PE

Three Laws of Motion- SCI &TECH & PE

Conservation of Mass and Energy- SCI &TECH & PE

The Law of Thermodynamics- SCI &TECH & PE

Continuum Assumption- SCI &TECH & PE

Knudsen Number- SCI &TECH & PE

Pascal's Law- SCI &TECH & PE

Static Pressure- SCI &TECH & PE

Volume and Velocity of Flow- SCI &TECH & PE

Understanding the Venturi- SCI &TECH & PE

Bernoulli's Principle- SCI &TECH & PE

Post Quiz

### **Section 3 – FLUID MECHANICS AND HYDRAULIC PRINCIPLES**

You will learn the basics of fluid mechanics and hydraulic principles. At the end of this section, you the student will be able to understand and describe primary water mechanics and hydraulic principles.

Key Terms

Hydraulic Systems Intro- SCI &TECH & PE

Hydraulics- SCI &TECH & PE

Fluid Mechanics- SCI &TECH & PE  
Properties of Fluids- SCI &TECH & PE  
Fluid Statics- SCI &TECH & PE  
Fluid Dynamics- SCI &TECH & PE  
Gases and Liquids- SCI &TECH & PE  
Surface Tension- SCI &TECH & PE  
Friction Section- SCI &TECH & PE  
Kinetic Energy- SCI &TECH & PE  
Drag Force- SCI &TECH & PE  
Types of Drag - SCI &TECH & PE  
Parshall Flumes- SCI &TECH & PE  
Post Quiz

#### **Section 4 – EXPERIEMENTS AND EARLY APPLICATIONS**

You will learn the history of hydraulic principle theories and pumps. At the end of this section, you the student will be able to understand and describe simple hydraulic theories and the start of modern pumping principles.

Application Key Terms–PE & TECH &FM  
Modern Application–PE & TECH &FM  
The Hydraulic Lever –PE & TECH &FM  
Dudley Castle Engine- SCI &TECH & PE & FM  
Hawksbee's Dual Cylinder Pump- SCI &TECH & PE & FM  
Bell-Jar Receiver- SCI &TECH & PE & FM  
Forces on Submerged Surfaces- SCI &TECH & PE & FM  
Buoyancy- SCI &TECH & PE & FM  
Measurement of Specific Gravity- SCI &TECH & PE & FM  
Variations in Specific Gravity- SCI &TECH & PE & FM  
Hydrometer- SCI &TECH & PE  
Post Quiz

#### **Section 5 –HYDRAULIC FOUNDATIONS AND THEORIES**

You will learn the foundations of fluid mechanics and hydraulic principle theories. At the end of this section, you the student will be able to understand and describe early hydraulic scientists who founded hydraulic ideas.

Blaise Pascal- SCI &TECH & PE & FM  
Key Terms- SCI &TECH & PE & FM  
Hydraulic Foundations and Theories Intro- SCI &TECH & PE & FM  
Archimedes- SCI &TECH & PE & FM  
Daniel Bernoulli- SCI &TECH & PE & FM  
Development of Hydraulics- SCI &TECH & PE & FM  
Pascal Law- SCI &TECH & PE & FM  
Evangelista Torricelli- SCI &TECH & PE & FM  
Post Quiz

#### **Section 6- PUMPS AND PUMPING WATER**

You will learn the basics of various pumps. At the end of this section, you the student will be able to understand and describe water pumps and the associated hydraulic principles.

General Pumping Fundamentals-PE & FM & TECH & O&M  
Pump Operation-PE & FM & TECH & O&M

Types of Pumps-PE & FM & TECH  
Pump Categories-PE & FM & TECH & O&M  
Types of Water Pumps-PE & FM & TECH & O&M  
Simple Pumps-PE & FM & TECH & O&M  
Impulse Pump - PE & FM & TECH & O&M  
Gravity Pump - PE & FM & TECH & O&M  
Wind Mills- PE & FM & TECH & O&M  
Sling Pump- PE & FM & TECH & O&M  
Pump Glossary-PE & FM & TECH  
Post Quiz

### **Section 7- COMPLICATED PUMPS**

You will learn the more about pumps, specifically, the complicated pumps. At the end of this section, you the student will be able to understand and describe types of complicated based on application and capabilities with a focus upon the two major groups of pumps are dynamic and positive displacement.

Complicated Pumps Intro-PE & FM & TECH & O&M  
Pump Diagrams -PE & FM & TECH  
Centrifugal Pump-PE & FM & TECH  
Progressive Cavity-PE & FM & TECH  
Peristaltic Pump-PE & FM & TECH  
Reciprocating Pump-PE & FM & TECH  
Vapor Pressure and Cavitation -PE & FM & TECH  
Submersible Pump-PE & FM & TECH & O&M  
Vertical Turbine-PE & FM & TECH & O&M & GP  
Pump Troubleshooting-PE & FM & TECH & O&M & GP  
Pump Not Delivering Water-PE & FM & TECH & O&M & GP  
Post Quiz

### **Section 8- PUMP OPERATION AND PERFORMANCE**

You will learn the basics of pump operation. At the end of this section, you the student will be able to understand and describe principles required to pump water.

Pump Requirements-PE & FM & TECH  
Pump Specifications-PE & FM & TECH  
Pump Efficiency-PE & FM & TECH  
Net Positive Suction Head Section-PE & FM & TECH  
Pump Viscosity-PE & FM & TECH  
Suction Lift-PE & FM & TECH  
Affinity Laws - Centrifugal Pumps-PE & FM & TECH  
Motor and Pump Calculations-PE & FM & TECH  
Pump Operation Post Quiz

### **Section 9- MOTOR AND COUPLING SECTION**

You will learn the basics of motor to pump coupling. At the end of this section, you the student will be able to understand and describe various pump/motor connections and troubleshooting procedures.

Coupling Introduction-PE & FM & TECH & O&M & GP  
Alignment of Couplings-PE & FM & TECH & O&M & GP  
Packing Seals-PE & FM & TECH & O&M & GP

Mechanical Seals-PE & FM & TECH & O&M & GP  
Pump Operating Problems-PE & FM & TECH & O&M & GP  
Stuffing Box Installation-PE & FM & TECH & O&M & GP  
Impeller Adjustment-PE & FM & TECH & O&M & GP  
Post Quiz

### **Section 10- ELECTRICAL MOTORS**

You will learn the basics of an electric motor. At the end of this section, you the student will be able to understand and describe commonly found electrical motors used in water production.

Motor Starter

Two Types of Enclosed Motors-PE & TECH & O&M & GP

Motor Lubrication- O&M & TECH & SPARK

Understanding Motors- O&M & TECH & SPARK

Reviewing AC Motors- O&M & TECH & SPARK

DC Motors- O&M & TECH & SPARK

Rotary Motors- O&M & TECH & SPARK

Motor Maintenance-PE & TECH & O&M & GP

Understanding Single Phase- O&M & TECH & SPARK

Transformers- O&M & TECH & SPARK

Calculating Voltage- O&M & TECH & SPARK

Polyphase- O&M & TECH & SPARK

Post Quiz

### **Section 11- SCADA**

You will learn the basics of the SCADA (or supervisory control and data acquisition) system.

The student will be able to understand and describe the purpose of SCADA and the basic operation of SCADA systems.

SCADA Explained-SCADA & TECH

SCADA Concepts-SCADA & TECH

SCADA Considerations-SCADA & TECH

SCADA Benefits-SCADA & TECH

Human Machine Interface Introduction-SCADA & TECH

Remote Terminal Unit-SCADA & TECH

Operational Philosophy-SCADA & TECH

PLC/RTV Programming-SCADA & TECH

SCADA Architectures-SCADA & TECH

Community Infrastructures-SCADA & TECH

SCADA Security Issues-SCADA & TECH

References

Post Quiz

### **Task Analysis and Training Needs Assessment Process Information Gathering**

Task Analysis and Training Needs Assessments have been conducted to determine or set Needs-To-Know for the basis of this continuing education course. TLC has primary used Training Provider Manual for the Pennsylvania Water and Wastewater System Operator Training Program for course goal setting and learning objectives for all three training formats; conventional classroom, distance paper based and web based training.

## Topic Legend

This CEU course covers several educational topics/functions/purposes/objectives of hydraulic and pumping principles including groundwater production, engineering, physics laws, hydraulic theories and pump operation.

Educational topic (objectives assessment) categories were determined by beta-testing.

The topic categories listed below are to assist in determining which educational objective or goal to be covered in a specific topic area:

**CROSS-CONNECTION (CC):** Having to do with cross-connection control and backflow prevention. Simple hydraulic principles. This may be considered O&M training for many operators.

**ELECTRICAL (SPARK):** This section has to do with electrical principles and difficult math calculations. Maybe good for credit for those who hold an electrician or instrumentation certification. This may be considered O&M training for many operators.

**FLUID MECHANICS (FM):** Having to do with hydraulic or fluid mechanics. A highly technical and specialized engineering field. This may be considered O&M training for many operators or credit for pump engineers or well drillers.

**GROUNDWATER MINING OR PRODUCTION (GP):** This may be considered O&M training for many operators or credit for pump engineers or well drillers.

**MOTOR:** Having to do with the electrical-mechanical portion of moving water. This may be considered O&M training for many operators. Maybe good for credit for those who hold an electrician or instrumentation certification.

**OPERATIONS AND MAINTENANCE O&M:** This area is for normal operation and/or maintenance of the distribution system. Part of O&M training requirement for many operators.

**PUMP ENGINEERING (PE):** The technical science of pumping and pump performance principles. May be a law or theory or calculation related to pumping. Information that a pump engineer or well operator may need.

**SCADA:** Having to do with data acquisition and control methods. Remote operation of pumps and motors from a distant location or cell phone. Maybe good for credit for those who hold an electrician or instrumentation certification.

**SCIENCE (SCI):** Having to do with scientific principles, laws or theories. A principle that can be observed or repeated in the Laboratory. May be good for laboratory or engineering credit.

**TECHNICAL (TECH):** The engineering or administrative, mechanical or physical pumping related process/component. The applications, engineering, history or theory that is critical to the pump operation or composition of water (pH). May include advanced groundwater treatment methods or centrifugal pump operation. This may be considered O&M training for many operators or credit for pump engineers or well drillers.



### **Accreditation Formula for Figuring CEU Credit**

The results of beta-testing were used in conjunction with a formula to determine average student time for accreditation purposes for intended audiences. This formula may not work for unintended audiences.

1 page of text = 2 minutes of student time.

1 Math practice problem = 1 minute of student time.

1 word quiz/exam question = 1 minute of student time.

500 pages times 2 equals 1000 divided by 60 minutes = 16 hours

400 post examination questions divided by 60 = 6 hours

***We are asking for 20 hours of credit.***

### **Specific Course Goals and Timed Outcomes (Beta Testing) Short Summary**

44 students were successfully tested and the average time necessary to complete each task was recorded stated in the above objectives and timed outcome section. In the above timed outcome section area, the tasks were measured using times spent on each specific objective goal and final assignment grading of 70% and higher. 65 students were originally given a task assignment survey in which to track their times on the above learning objectives (course content) and utilized a Scantron answer sheet to complete their final assignment. All students were given 30 days to complete this assignment and survey. Only 44 were successful and passed the final assignment with the highest passing score of 99 and the lowest score of 70 percent with 21 students failing by not completing the assignment or scoring less than 70 percent. Average high score was 92, with the average passing score of 84 percent. Average time for course assignment completion was 28.2 hours and specifically 20.3 hours for Pumps 202. The majority of students found this assignment easy to complete without assistance. Rusty Randall Proctor, April 1, 2010 Powell Unit

### **2014 Second Beta Testing Breakdown**

Out of seventy successful students who participated in the Second Beta Testing sixty percent of successful students performed at or above the *Basic* level in 2014 with an average score of 74 percent. Thirty-five percent of successful students performed at or above the *Proficient* level, demonstrating their competency over challenging pumping/motor principle concepts content with an average score of eight two percent. Two percent of successful students performed at the *Advanced* level in follow-up 2014 beta testing with a high score of 99 percent. Rusty Randall Proctor, August 24, 2014 London, Ohio MACI.

### **Final Conclusion**

The average time for the Pumps 202 is 20.3 hours with an average score of 78 percent.

## Beta Course Training/Assessment Survey Results

1. The difficulty of your course.

Very Easy    0    1    2    3    4    5    Very Difficult

2. Please rate the difficulty of the testing process.

Very Easy    0    1    2    3    4    5    Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.

Very Similar    0    1    2    3    4    5    Very Different

## Ongoing Course Evaluation

Administrative and instructional staff will collect all student concerns (verbal, written and surveys) and distribute these to Jeff Durbin and Bubba Jenkins for evaluation and course corrections.

## Task Analysis and Training Needs Assessment Process Information Gathering

Task Analysis and Training Needs Assessments have been conducted to determine or set Needs-To-Know for the basis of TLC's continuing education courses. The following is a listing of some of those who have conducted extensive valid studies from which TLC has based the continuing education program upon: the Environmental Protection Agency (EPA), the Arizona Department of Environmental Quality (ADEQ), the Texas Commission of Environmental Quality (TCEQ), Pennsylvania Dept of Environmental Protection (PDEP) and the Association of Boards of Certification (ABC).

TLC has primary used Training Provider Manual for the Pennsylvania Water and Wastewater System Operator Training Program for course goal setting and learning objectives for all three training formats; conventional classroom, distance paper based and web based training.

The titles or names of subjects (Learning Objectives) may be changed for readability purposes. Some of the terms used in this document may be part of a copyrighted adult learning assessment process and in these cases, we utilize generic terminology. The needs assessment/survey maintains our training and education materials criteria. Assessments and changes are performed based on changes in technology, evaluations of the students, regulatory changes and editorial corrections. Most of this information is considered intellectual property and may not be owned by TLC but by third –parties. All of TLC's information is proprietary.

## Assessment Implications

Core tasks have been statistically analyzed then reviewed and edited by the Advisory Committee, SME Experts. These tasks now form a distinct definition of the course and assessment content. The emphasis for most of the levels of operation would be found in the duty/functions discussion below. To recap, bodies of knowledge and concepts that support the understanding and valid performance of the following duty/functions should be taught first. Based on the job-task survey data and beta-testing, the most useful parts of the course are beneficial for the following:

## ADDIE

TLC utilizes a five-phase instructional design model consisting of Analysis, Design, Development, Implementation, and Evaluation for our continuing education courses. Each course design step has an outcome that feeds into the next step in the sequence. The five phases of ADDIE are as follows:

## **ANALYSIS**

During the Training Needs Assessment Process Information Gathering Analysis phase, the course designer(s)(see Subject Matter Experts and Contributing Editors) identifies the learning need, the goals and objectives, the student's needs, existing knowledge, Course Statement of Need, and any other relevant characteristics (State or Federal Need-to-Know) and to ensure that students are learning what is relevant for their job.

## **DESIGN**

This is the systematic process of specifying learning objectives from the Training Needs with a focus on Bloom's Taxonomy. A detailed storyboard following the Needs Assessment/Survey and/or Course Statement of Need will determine the course content.

## **DEVELOPMENT**

The actual creation (production) of the training content will begin based upon the Design phase using Bloom's Taxonomy. At this time, a decision is made to proceed or table the course.

## **IMPLEMENTATION**

During implementation, the Alpha testing plan is put into action and a procedure for course and/or assessment revision is implemented. These course materials and assessments are delivered or distributed to the student group. After delivery, the effectiveness of the training materials is evaluated in Beta testing phase. All of our courses have extensive Alpha and Beta testing to ensure job relevancy, correct information and course learning objectives are met.

## **EVALUATION**

This phase consists of (1) formative and (2) summative evaluation from Alpha and Beta testing. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation consists of tests designed for criterion-related referenced items and providing opportunities for feedback from the students and proctor. **Ongoing Course Evaluation:** Administrative and instructional staff will collect all student concerns (verbal, written and surveys) and distribute these to TLC Administrative personnel for evaluation and course corrections. Course and/or Assessment revisions are made as necessary.

### **Precept-Based (Micro-Learning) Training Course**

TLC's training courses are based upon a form of induction training, made of topical and technical precepts that are discovered in the Needs Assessment/Survey and/or Training Needs Assessment Process Information Gathering. The training topics or learning objectives are made up of "micro-content" or "precepts"— or small chunks of information that can be easily digested. These bite-size pieces of technical information are considered to be one of the most effective ways of teaching students new or important information (regulatory or technical) because it helps the mind retain knowledge easier.

Micro-learning or precept-based training doesn't rely on the student to process a large amount of information before breaking it down. Our method includes short modules with clearly defined learning goals for each section. This method allows a student to hone in on a particular skill, then given the opportunity to exhibit their knowledge in the final assessment (assignment).

### **Course Training/Assessment Needs Methodology**

Technical Learning College identified training/assessment needs by placing identifying them in two categories; internal and external.

**Internal Methods include:**

- ✓ Observation
- ✓ Interviews
- ✓ Instruments: Perception instruments and Knowledge based assessments
- ✓ Student records and reports
- ✓ Group problem analysis (Classroom or Seminars)
- ✓ Performance or Survey appraisals

**External Methods include:**

- ✓ Outside consultants (Completion)
- ✓ Government Certification Reviews (Training Needs)
- ✓ Records and reports from other agencies

The needs assessment/survey maintains our training and education materials criteria. Assessments and course material changes are performed based on changes in technology, evaluations of the participants and regulatory changes. Materials are assessed yearly or as needed to insure course integrity.

**TLC's Teaching Techniques and Assessment Tools**

Our training courses are based upon a form of induction training, made of topical and technical precepts. The training topics are made up of "micro-content" or "precepts"– or small chunks of information that can be easily digested. These bite-size pieces of technical information are considered to be one of the most effective ways of teaching people new information because it helps the mind retain knowledge easier. Micro-learning or precept-based training doesn't rely on the student to process a large amount of information before breaking it down. Our method includes short modules with clearly defined learning goals for each section with a post quiz and a final assessment (quiz). This method of pre-quiz allows a student to hone in on a particular skill, then given the opportunity to exhibit their knowledge in the final assessment.

**TLC's Educational Learning Objective Topics**

The general course descriptions or topic titles may be different from the detailed description of the course's outline or learning objectives. These terms may be an alternative expression or a substitute but essentially having the same meaning. This is done for reading or for editing purposes. The detailed alpha and beta-testing data is not available in this document and is proprietary information belonging to a third party. The CEU course covers several educational topics/functions/purposes/objectives of compliance. The general course description of topics may be different from the detailed description. These differences are cosmetic only. The topics listed are to assist in determining which educational objective or goal that is covered for a specific educational topic area. The general information is available in the detailed beta-testing information and may be found in the course's table of contents. The detailed testing information is not available in this document and is proprietary information.

### **Extensive Academic Research**

Technical Learning College's (TLC's) continuing education course material development was based upon several factors; field experience working in the water quality field, extensive academic research (teaching in the community college system), advice from subject matter experts (State officials and industry leaders), data analysis, task analysis and training needs assessment process information gathered from other states.

Both Melissa and Jeff Durbin are the two primary Instructors, Subject Mater Experts and Technical Writers have trained and/or certified more than ten thousand students. These two Instructors teach on a daily basis in a classroom setting throughout Arizona and on-line to students nationwide. See below for more information.

### **Course Author**

#### **Melissa Durbin**

This course was co-authored by Melissa Durbin; she has over 30 years of water/wastewater treatment teaching experience as a college instructor. Melissa has written the several nationally accepted wastewater treatment manuals since 2001. This course has been accepted in most States for continuing education credit. Melissa has taught approximately 10,000 students about water/wastewater treatment, disinfection and related classes, including mathematic and calculation principles. She will be available to answer questions relating this course.

### **Advice from Subject Matter Experts**

Both Melissa and Jeff Durbin are professional trainers and have been educated in current trends in professional education and continuing education needs.

### **Primary Course Designers Melissa and Jeff Durbin**

#### **Melissa Durbin**

This course was co-designed by Melissa Durbin; she has over 30 years of teaching water and wastewater treatment experience as a college instructor. Melissa has written the several nationally accepted water and wastewater treatment manuals. Melissa has taught approximately 10,000 students about water and wastewater treatment and related classes. She will be available to answer questions relating this course.

#### **Jeff Durbin**

This course was co-designed by Jeff Durbin, over 10 years of water and wastewater treatment experience as a backflow inspector for the City of Phoenix and 20 years of water and wastewater treatment experience. Jeff has taught approximately 10,000 students about water and wastewater treatment primarily in water distribution, and pollution control (water quality) related classes. Jeff will also be able to answer any question pertaining to this course.

### **Course Complier**

Peter Easterberg, Detail-oriented technical writer/technical editor/desktop publisher/copy editor. 20 years' experience editing and writing feasibility and trade-off studies, test procedures, specifications, user manuals, company policies, HR forms, and ISO-9000 documents. Exceptional grammatical/written communication skills. "Go-to" person for Microsoft Word, Outlook, and general computer questions. Internet Webmaster Certificate (including HTML)

### **Contributing Editors**

**James L. Six** Received a Bachelor of Science Degree in Civil Engineering from the University of Akron in June of 1976, Registered Professional Engineer in the State of Ohio, Number 45031 (Retired), Class IV Water Supply Operator issued by Ohio EPA, Number WS4-1012914-08, Class II Wastewater Collection System Operator issued by Ohio EPA, Number WC2-1012914-94

**Joseph Camerata** has a BS in Management with honors (magna cum laude). He retired as a Chemist in 2006 having worked in the field of chemical, environmental, and industrial hygiene sampling and analysis for 40 years. He has been a professional presenter at an EPA analytical conference at the Biosphere in Arizona and a presenter at an AWWA conference in Mesa, Arizona. He also taught safety classes at the Honeywell and City of Phoenix, and is a motivational/inspirational speaker nationally and internationally.

**James Bevan**, Water Quality Inspector S.M.E. Twenty years of experience in the environmental field dealing with all aspects of water regulations on the federal, state, and local levels. Experience in the water/wastewater industry includes operation of a wastewater facility, industrial pretreatment program compliance sampling, cross-connection control program management, storm water management, industrial and commercial facility inspections, writing inspection reports for industry, and technical reports per EPA permit requirements. Teacher and Proctor in Charge for Backflow Certification Testing at the ASETT Center in Tucson for the past 15 years and I possess an Arizona Community College, Special Teaching Certificate in Environmental Studies. Extensive knowledge and experience in college course and assignment/assessment writing.

**Dr. Pete Greer** S.M.E., Retired biology instructor, chemistry and biological review.

**Jack White**, Environmental, Health, Safety expert, City of Phoenix. Art Credits

## **Course Procedures for Registration and Support**

All of Technical Learning College's distance learning courses have complete registration and support services offered. Delivery of services will include e-mail, web site, telephone, fax and mail support. TLC will attempt immediate and prompt service.

When a student registers for a correspondence course, he/she is assigned a start date and an end date. It is the student's responsibility to note dates for assignments and keep up with the course work. If a student falls behind, he/she must contact TLC and request an end date extension in order to complete the course. It is the prerogative of TLC to decide whether to grant the request. All students will be tracked by a unique computer generated number assigned to the student.

### **Disclaimer and Security Notice**

The student shall understand that it their responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. The student shall understand and follow State laws and rules concerning distance learning courses and understand these rules change on a frequent basis and will not hold Technical Learning College responsible for any changes. The student shall understand that this type of study program deals with dangerous conditions and will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury caused by this CEU education training course material. The student shall contact TLC if they need help or assistance and double-check to ensure my registration page and assignment has been received and graded.

### **Student's Identity, Attendance, and Participation Verification**

A proctoring report and/or computer-tracking program validates proper identity, attendance and participation. The student shall submit a driver's license for signature verification and track their time worked on the assignment. The student shall also sign an affidavit verifying they have not cheated and worked alone on the assignment. We follow up with telephone confirmation and/or quiz review assessment. All student attendance is tracked on TLC's student attendance database.

### **Student Information Personal Data Security Procedures**

All information regarding the student is strict and privileged only. This information is held in secure databases and is not sold or provided to any one unless the student requests a copy or a State agency does an audit. Even during audits, we restrict confidential information unless the Agency can provide a legitimate excuse. Some of this security information and data is priority and details are not provided. Students are not provided with any passwords at this time.

### **Feedback Mechanism (examination procedures)**

Each student will receive a feedback or survey form as part of his or her study packet. You will be able to find this form in the front of the assignment lesson. The student can e-mail, snail mail or telephone TLC for any concern at any time. Most of these concerns will be answered in 2 hours but not more than 24 hours. TLC has three support staff administrators with modern computers and all have excellent communication and computer skills able to respond and track all students and required forms and assignment. We have a dedicated computer student tracking system database that is backed-up on a daily based and this information is secured and stored at a secure offsite location.

### **TLC Contact Information**

All instructors and administrative staff are obligated to respond within 1 day by email, snail mail or telephone providing proper guidance to successfully complete the assignment. Email and telephone inquiries are handled quickly, generally within 2 hours of the call. We encourage students to complete their work with less frustration and fewer delays by calling or e-mailing us for any concern. We attempt to provide direct interaction similar to conventional classroom training.

### **Security and Integrity**

All students are required to do their own work. All lesson sheets and final exams are not returned to the student to discourage sharing of answers. Any fraud or deceit and the student will forfeit all fees and the appropriate agency will be notified. A random test generator will be implemented to protect the integrity of the assignment.

### **Student Information Personal Data Security Procedures**

All information regarding the student is strict and privileged only. This information is held in secure databases and is not sold or provided to any one unless the student requests a copy or a State agency does an audit. Even during audits, we restrict confidential information unless the Agency can provide a legitimate excuse. Some of this security information and data is priority and details are not provided. Students are not provided with any passwords at this time.

### **Certificate of Completion**

TLC will offer the student either pass/fail or a standard letter grading assignment. If TLC is not notified, the student will only receive a pass/fail notice. In order to pass your final assignment, you are required to obtain a minimum score of 70% on your assignment. The certificate of completion will have all text in capital letters and there is a water mark of the Technical Learning College in three colors along with anti-counterfeiting security measures on the edge of the certificate. An electronic copy is assigned to the student's electronic record with issue date.

### **Student Assistance**

The student shall contact TLC if they need help or assistance and double-check to ensure my registration page and assignment has been received and graded.

### **Instructions for Written Assignments**

The Pumps 202 training CEU course uses multiple choice questions. Answers may be written in this manual or typed out on a separate answer sheet. TLC prefers that students type out and e-mail their answer sheets to [info@tlch2o.com](mailto:info@tlch2o.com), but they may be faxed to (928) 468-0675.

### **Final Examination for Credit**

Opportunity to pass the final comprehensive examination is limited to three attempts per course enrollment.

### **Required Texts**

This course comes complete and does not require any other materials.

### **Environmental Terms, Abbreviations, and Acronyms**

TLC provides a glossary in the rear of this manual that defines, in non-technical language, commonly used environmental terms appearing in publications and materials, as well as abbreviations and acronyms used throughout the EPA and other governmental agencies.



## **ADA Compliance**

TLC will make reasonable accommodations for persons with documented disabilities. Students should notify TLC and their instructors of any special needs. Course content may vary from this outline to meet the needs of these particular students.

## **Educational Learning Objective Topics**

The CEU course covers several educational topics/functions/purposes/objectives. The topics listed are to assist in determining which educational objective or goal is covered for a specific topic area. This information is available in the detailed beta-testing information and may be found in the course's table

## **Feedback Mechanism (Examination Procedures)**

Each student will receive a feedback or survey form as part of his or her study packet. The student will be able to find this form in the front of the assignment or lesson(assessment). The student can e-mail, snail mail or telephone TLC for any concern at any time.

## **Student Concerns**

Most of student/training course related concerns are generally answered within 2 hours but not more than 24 hours. TLC has three support staff administrators with computers and telephones and have excellent communication and computer skills and able to respond and track all students and obtain or submit required forms and assignments. TLC has a dedicated computer student tracking system database that is backed-up on a daily bases and this information is secured and stored at a secure offsite location in case of fire or security problems. All student website information is tracked and documented for security measures.

## **Recordkeeping and Reporting Practices**

TLC keeps all student records for a minimum of five years. It is the student's responsibility to give the completion certificate and/or paperwork to the appropriate government agencies. If necessary, we will electronically submit the required information to New York, Colorado, Texas, Indiana, Pennsylvania and any other required state for your certification renewals.

## **TLC Record Storage**

TLC's training records include the following elements:

1. Individual course training (assessment) and registration page (Customer Order Record) is recorded in Excel format and the hard copies are scanned and stored in a computer database for 5 years and include the following:
  - a. the instructor(s) who taught each session on that date the of the training session or grading was offered (in comments section registration page) as well as which instructor was considered to be the lead instructor(s) and by the Director.
  - b. the name of the instructor(s) and facilitator(s) who proctored and/or graded the examination for each training session if applicable (in comments section registration page);
  - c. the attendance sign-in sheet(s) (registration page) for each training course or session;
  - d. all graded and dated validated examination answer (Assessment) sheets for each examination attempt including an explanation (written in comments and/or Excel list) for any retests as well as a narrative explaining any assistance provided to the attendee before the re-test; and
  - e. session evaluation(survey)forms (in comments section registration page and or Excel list).

### **Grading Criteria**

TLC offers students the option of either pass/fail or assignment of a standard letter grade. If a standard letter grade is not requested, a pass/fail notice will be issued. Final course grades are based on the total number of possible points. The grading scale is administered equally to all students in the course. Do not expect to receive a grade higher than that merited by your total points. No point adjustments will be made for class participation or other subjective factors. For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity.

### **Final Assignment**

The final examination assignment is determined by the examination administrator or the instructor and there are generally three versions that are readily available. There are also three levels of the examination from average, (5 Answers) Difficult (5 +All of the above) and very difficult (Six answers and All of the above). The student is provided the average rated examination unless there is a condition or concern that requires a more difficult examination. Example, two or more students at the same address or any suspicion of cheating or potential fraud. We try to ensure the security and learning experience. Assignments/answer keys are only accessible to instructors and administrative staff that have a need to know clearance.

### **Failure**

If the student fails the examination, they are provided with two more chances to successfully pass the exam with a score of 70% or better. The student may receive a different and randomly generated exam. Upon failure of an exam, the student can submit their concerns in writing or submit a survey form and has the option to receive instructor assistance that would be equivalent to conventional classroom assistance in discovering the areas that are deficient. The instructor has the option in describing the assistance method or procedure depending upon the student's deficiencies.

### **Grading Criteria**

TLC will offer the student either pass/fail or a standard letter grading assignment.

- A 900 – 1000 points
- B 800 – 899 points
- C 700 – 799 points
- D 600 – 699 points
- F <600 points

In order to successfully pass this course, you will need to have 70% on the final exam. The entire assignment is available on TLC's Website in a Word document format for your convenience.

### **Forfeiture of Certificate (Cheating)**

If a student is found to have cheated on an examination, the penalty may include--but is not limited to--expulsion; foreclosure from future classes for a specified period; forfeiture of certificate for course/courses enrolled in at TLC; or all of the above in accordance with TLC's Student Manual. A letter notifying the student's sponsoring organization (State Agency) of the individual's misconduct will be sent by the appropriate official at TLC. No refund will be given for paid courses. An investigation of all other students that have taken the same assignment within 60-day period of the discovery will be re-examined for fraud or cheating. TLC reserves the right to revoke any published certificates and/or grades if cheating has been discovered for any reason and at any time. Students shall sign affidavit agreeing with all security measures. The student shall submit

a driver's license for signature verification and track their time worked on the assignment. The student shall sign an affidavit verifying they have not cheated and worked alone on the assignment.

**Note to students: Keep a copy of everything that you submit.**

If your work is lost, you can submit your copy for grading. If you do not receive your certificate of completion or quiz results within two or three weeks after submitting it, please contact us immediately. We expect every student to produce his/her original and independent work.

Any student whose work indicates a violation of the Academic Misconduct Policy (cheating, plagiarism) can expect penalties as specified in the Student Handbook, which is available through Student Services; contact them at (928) 468-0665. A student who registers for a distance learning course is assigned a "start date" and an "end date." It is the student's responsibility to note due dates for assignments and to keep up with the course work. If a student falls behind, she/he must contact the instructor and request an extension of her/his *end date* in order to complete the course. It is the prerogative of the instructor to decide whether or not to grant the request.

Your assignments are due on time. Any assignment or mailed-in examination that is one to five days late will be marked down one letter grade. Any assignment or mailed-in examination that is turned in *later* than five days will not be accepted and will be recorded in my grade book as "non-participating" and you can be withdrawn from class. (See final grade options.)

**Proctoring Instructions**

Students enrolled in Technical Learning College's CEU courses that require proctored testing and **who do not live in the physical service area** of the Technical Learning College Test Center must nominate and gain prior approval of a proctor who will monitor course tests. A new proctor nomination form is required for each term and for each class.

**PROCTORS, If Necessary...**

A proctor is an individual who agrees to receive and administer a student's test(s) from Technical Learning College at the proctor's business email address. The test(s) will be ethically and professionally administered in a suitable testing environment (e.g., college/library or professional office). The proctor will return the test(s) to the Technical Learning College Test Center via fax immediately after administration, and the proctor will mail the exam within one (1) work day of administration to the Technical Learning College Test Center.

Proctors certify in writing to the Technical Learning College Test Center that the student completed the test according to all of the specific directions provided in the proctor guidelines letter. As the Proctor Nomination Form indicates, the student will identify the specific test(s) the proctor will monitor.

Any proctor the student nominates must be acting in the official capacity in one of the following positions:

- **College or University Personnel:** Dean, Department Chair, Student Records, Professional Staff Member of an adult/continuing education office or counseling center, Librarian, Professor, or any official testing center personnel if the tests are administered in the center.
- **Armed Forces Education Office Personnel**

- **Public or Private School Personnel:** Superintendent, Principal, Guidance Counselor, or Librarian.
- **Other:** Civil Service Examiner, Librarian for City/County, HR Professional, or Education/Training Coordinator.

**The following persons do not qualify as proctors:**

- Co-workers, someone who reports to you or your immediate supervisor
- Friends
- Neighbors
- Relatives

**Nominating a Proctor**

Students are responsible for identifying, nominating, and making all of the arrangements for the proctoring of their course tests, including the payment of any fees for services and the return of test materials to Technical Learning College Test Center (cost of FAX or postage). The proctor must be able to receive the student's test(s) via email as attachments. The Technical Learning College Test Center does not accept Yahoo, AOL, G-mail, Hotmail, or etc. email addresses.

If the student is unable to find a suitable proctor, they must contact the Technical Learning College Test Center for assistance immediately via email.

**Proctor Nomination Form**

Students will use the Proctor Nomination Form for nomination and approval of a proctor. The student will complete the top part of the form for each course s/he is taking, even if the same proctor is used for all tests. The student must click on the submit button for the data to be electronically transmitted to the Technical Learning College Test Center.

**Disclaimer Notice**

It is ultimately the student's responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. The student shall understand State laws and rules change on a frequent basis and believe this course is currently accepted in their State for CEU or contact hour credit, if it is not, the student shall will not hold Technical Learning College responsible. The student shall also understand that this type of study program deals with dangerous conditions and that the student shall will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury caused by this CEU education training course material. The student shall will call or contact TLC if help or assistance is needed and double-check to ensure the registration page and assignment has been received and graded.

**Affidavit of Exam Completion**

The student shall affirm that they alone completed the entire text of the course. The student shall affirm that they completed the exam without assistance from any outside source. The student shall understand that it is their sole responsibility to file or maintain their certificate of completion as required by the state.

**Refund Policy**

We will beat any other training competitor's price for the same CEU material or classroom training. Student satisfaction is guaranteed. We will refund course fees if the course is not accepted for credit by the State. Otherwise, any other problem will be given an exchange credit

towards an acceptable or approved course for the State. Once we are notified of the refund or exchange, we will generally issue a refund in 30 days of the problem and exchange within the same day.

### **Continuing Education Units**

You will have 90 days from receipt of this manual to complete it in order to receive your Continuing Education Units (**CEUs**) or Professional Development Hours (**PDHs**). A score of 70% or better is necessary to pass this course. If you should need any assistance, please visit our Assistance Page on the website. Please e-mail all concerns and the final test to [info@tlch2o.com](mailto:info@tlch2o.com).

### **Mission Statement**

Our only product is educational service. Our goal is to provide you with the best possible education service possible. TLC will attempt to make your learning experience an enjoyable opportunity.

### **Note to Students**

**Keep a copy of everything that you submit!** If your work is lost, you can submit your copy for grading. If you do not receive your certificate of completion or other results within two to three weeks after submitting it, please contact your instructor.

### **When the Student finishes this course...**

#### **At the conclusion of this course:**

The student will understand various water lifting procedures, basic pump fundamentals, hydraulic principles, related electrical, motor principles and be able to describe common pumping principles, electrical troubleshooting and solve pump/hydraulic problems.

### **Educational Mission**

#### **The educational mission of TLC is:**

To provide TLC students with comprehensive and ongoing training in the theory and skills needed for the environmental education field,

To provide TLC students with opportunities to apply and understand the theory and skills needed for operator certification,

To provide opportunities for TLC students to learn and practice environmental educational skills with members of the community for the purpose of sharing diverse perspectives and experience,

To provide a forum in which students can exchange experiences and ideas related to environmental education,

To provide a forum for the collection and dissemination of current information related to environmental education, and to maintain an environment that nurtures academic and personal growth.

### **Important Information about this Manual**

This manual has been prepared to educate operators in the general education of pumping, pumps, motors, and hydraulic principles including basic water training and different pump applications. For most students, the study of pumping and hydraulics is quite large, requiring a major effort to bring it under control.

This manual should not be used as a guidance document for employees who are involved with cross-connection control. It is not designed to meet the requirements of the United States Environmental Protection Agency (EPA), the Department of Labor-Occupational Safety and Health Administration (OSHA), or your state environmental or health agency. Technical Learning College or Technical Learning Consultants, Inc. makes no warranty, guarantee or representation as to the absolute correctness or appropriateness of the information in this manual and assumes no responsibility in connection with the implementation of this information.

It cannot be assumed that this manual contains all measures and concepts required for specific conditions or circumstances. This document should be used for educational purposes and is not considered a legal document. Individuals who are responsible for hydraulic equipment, cross-connection control, backflow prevention or water distribution should obtain and comply with the most recent federal, state, and local regulations relevant to these sites and are urged to consult with OSHA, the EPA and other appropriate federal, state and local agencies.

**Library of Congress Card Number 6584962  
ISBN 978-0-9799559-6-9**

### **Copyright Notice**

©2005 Technical Learning College (TLC) No part of this work may be reproduced or distributed in any form or by any means without TLC's prior written approval. Permission has been sought for all images and text where we believe copyright exists and where the copyright holder is traceable and contactable. All material that is not credited or acknowledged is the copyright of Technical Learning College. This information is intended for educational purposes only. Most unaccredited photographs have been taken by TLC instructors or TLC students. We will be pleased to hear from any copyright holder and will make good on your work if any unintentional copyright infringements were made as soon as these issues are brought to the editor's attention.

Every possible effort is made to ensure that all information provided in this course is accurate. All written, graphic, photographic or other material is provided for information only. Therefore, Technical Learning College accepts no responsibility or liability whatsoever for the application or misuse of any information included herein.

Requests for acknowledgements or permission to make copies should be made to the following address:

TLC  
PO Box 3060  
Chino Valley, AZ 86323

Information in this document is subject to change without notice. TLC is not liable for errors or omissions appearing in this document.

**Student is required to submit the following information for assignment grading...**

1. 70 PERCENT ON FINAL ASSESSMENT
2. DRIVER'S LICENSE
3. SCHEDULE OF TIME WORKED ON ASSIGNMENT
4. AFFIDAVIT OF EXAM COMPLETION
5. PROCTOR CERTIFICATION
6. TELEPHONE CONFIRMATION

**PUMPS 202 CEU COURSE  
CUSTOMER SERVICE RESPONSE CARD**

NAME: \_\_\_\_\_

E-MAIL \_\_\_\_\_ PHONE \_\_\_\_\_

**PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.**

1. Please rate the difficulty of your course.

Very Easy    0       1       2       3       4       5    Very Difficult

2. Please rate the difficulty of the testing process.

Very Easy    0       1       2       3       4       5    Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.

Very Similar    0       1       2       3       4       5    Very Different

4. How did you hear about this Course? \_\_\_\_\_

5. What would you do to improve the Course?

---

---

How about the price of the course?

Poor \_\_\_\_ Fair \_\_\_\_ Average \_\_\_\_ Good \_\_\_\_ Great \_\_\_\_

How was your customer service?

Poor \_\_\_\_ Fair \_\_\_\_ Average \_\_\_\_ Good \_\_\_\_ Great \_\_\_\_

Any other concerns or comments.

---

---