

CEU COURSE DESCRIPTION

PUMPS AND MOTORS CEU TRAINING COURSE – 20 Hrs

This CEU course will review various pump and motor operations, starting with proper hydraulic sizing and electrical demand requirements and advancing to the electrical power and other related hydraulic components of pumping water. This course will present the student the engineering science pertaining to liquid pressure, flow and pumping dynamics. This course will cover the basics of hydraulic fundamentals commonly related to the study of the mechanical properties of water.

This course will also examine hydrostatics or fluid mechanics as well as the history and development of pumps, hydraulics and the science of fluids. This training course will present several familiar topics in pumping along with hydraulics and hydrostatics that often appear in most educational expositions of introductory science, and which are also of historical interest and can enliven a student's educational experience. ***You will not need any other materials for this course.***

Water Distribution, Well Drillers, Pump Installers, Water Treatment Operators, Wastewater Treatment Operators, Wastewater Collection Operators, Industrial Wastewater Operators, and Sewer and Spetic Installer. 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.

Course Statement of Need

All certified operators that work in the field need to be able to describe and explain the need for various water/wastewater pumps and motors and properly identify various pumping demands and purposes. Operators need to be able to describe and explain types of pressure, measurements of pressures, fluid flow, fluid velocity and atmospheric principles. Professional operators need to be able to describe various types of pumps, classifications and related parts, state the basic principles of positive dynamic and displacement pumps, describe various motor starters, main use of AC and DC motors, operations of level sensor controls, describe various types of couplings, bearings, seals and other pump components. Certified operators need to be able to describe cavitation and methods to prevent it and explain water hammer, describe various math principles and formulas for water and wastewater system operators and practice water related mathematical exercise that will examine pump and water mathematical skills.

Assessment Implications

Core tasks have been statistically analyzed then reviewed and edited by the TLC'S 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 bellow. To recap, bodies of knowledge and concepts that support the understanding and valid performance of the following duty/functions should be taught first:

Primary Training Course Goals

1. Ability to describe and explain the need for various Pumps and Motors and proper identification.
2. Describe and explain types of pressure, measurements of pressures, fluid flow, fluid velocity and atmospheric principles.
3. State the basic principles of positive dynamic and displacement pumps.
4. Describe various math principles and formulas for water and wastewater system operators.
5. Describe various types of pumps, classifications and related parts.
6. Describe various motor starters, main use of AC and DC motors, operations of level sensor controls.
7. Describe various types of couplings, bearings, seals and other pump components.
8. Describe cavitation and methods to prevent it and explain water hammer.
9. Practice water related mathematical exercise that will examine pump and water mathematical skills.
10. Understanding Hydraulic Requirements.
11. Describe and explain hydraulic related terms, including hydrostatics and hydrokinetics.
12. Understand and describe the history and science related to hydraulics; related fluid sciences.
13. Describe and explain Pascal's Law and Bernoulli's Principle.
14. Understanding and describe hydrostatic terms and requirements.
15. Explain and describe hydrostatics, liquids at rest, buoyancy and flotation, pressure on dams and submerged devices, and hydraulic presses.
16. Analyze and explain hydrodynamics, the study of liquids in motion.

Course Learning Objectives and Timed Outcomes

Pumping Principles Section Course Outline 20 hours total

This course will cover most general hydraulic ideas and related scientific concepts. The student will develop an ability to describe hydraulic ideas and understand the operation of hydraulic applications.

1. Ability to describe and explain the need for various Pumps and Motors and proper identification. Total Time 16 hours Numbers 1-9.
2. Describe and explain types of pressure, measurements of pressures, fluid flow, fluid velocity and atmospheric principles. 470 Minutes
 - A. Identify different types of pumps and related parts.
 - B. Identify the main purpose of a motor starter.
 - C. Describe the main use of AC and DC motors.
 - D. Describe the operations of level sensor controls.
 - E. Identify and describe the most commonly used pumps.
 - F. Identify the suction and discharge valving.
 - G. Distinguish between discharge head, total head, suction head, and suction lift.
 - H. Describe information obtained from pump performance graphs.
 - I. Identify types of couplings, bearings, seals and other pump components.
 - J. Describe the importance of alignment of coupling.
 - K. Indicate when packing seals need to be replaced.
 - L. Describe cavitation.
 - M. Describe water hammer.
3. State the basic principles of positive dynamic and displacement pumps. 215 Minutes
 - Summarize the principles of atmospheric pressure.

- Compare water and air as fluids.
 - Describe pressure in relation to fluids.
 - Analyze the effects of atmospheric pressure.
 - Examine the properties of water pressure.
 - Compare fluid flow and fluid velocity.
4. Describe various math principles and formulas for water and wastewater system operators. 25 Minutes
- Recognize geometric arguments for determining thrust.
 - Analyze calculations for force, pressure and area.
 - Calculate formulas for detention time, hydraulic loading rates, horsepower, organic loading rates, weir loading rates and treatment efficiency.
 - Determine how to figure volume of water in a tank or channel.
5. Describe various types of pumps, classifications and related parts. 110 Minutes
- Distinguish between discharge head, total head, suction head, and suction lift.
 - Describe information obtained from pump performance graphs.
 - State the basic principles of positive dynamic and displacement pumps.
 - Compare the types of positive displacement pumps.
 - List the different types of early pumps and describe their characteristics.
 - Analyze specific gravity.
 - Compare/contrast devices to determine specific gravity.
6. Describe various motor starters, main use of AC and DC motors, operations of level sensor controls. List common pressure sensing devices. 45 Minutes
- Compare the two types of motors.
 - Distinguish between the two types of totally enclosed motors.
 - Describe the purpose of a reduced voltage starter.
7. Describe various types of couplings, bearings, seals and other pump components. 105 Minutes
- Describe basic pump design and how centrifugal pumps work.
 - Identify the typical characteristics of a screw pump.
 - Examine components of submersible pumps and how they work.
 - State the two purposes of couplings.
 - Compare rigid and flexible couplings.
 - Compare the types of seals.
 - Analyze the advantages of mechanical seals.
 - Divide pump types into two major categories.
 - Deduce the five basics of pump performance.
 - Outline the troubleshooting process for pumps.
8. Describe cavitation and methods to prevent it and explain water hammer. 55 Minutes
- Describe cavitation and its causes.
 - Define water hammer.
 - Evaluate how to avoid cavitation.
 - Explain the use of cavitations number.
9. Practice water related mathematical exercise that will examine pump and water mathematical skills.
10. Understanding Hydraulic Requirements Total Time 4 Hours Numbers 10-13.
- A. Hydraulic Definitions
 - B. Fluid Terms
 - C. Hydraulic History
 - D. Hydraulic Science
 - E. Hydraulics in Today's Applications and Uses
11. Describe and explain hydraulic related terms, including hydrostatics and

hydrokinetics. 150 Minutes

- Explain the concept of hydrostatics.
- Define fluid and give examples of solids that can flow like liquids.
- Describe standard atmospheric pressure.
- Explain vacuum in relation to pressure.
- Illustrate how a siphon works.
- Analyze the importance of atmospheric pressure in meteorology.
- Name four forces of nature.
- Define static pressure.
- Analyze the hydrostatic paradox.

12. Understand and describe the history and science related to hydraulics; related fluid sciences. 60 minutes

- State the basis of the word “hydraulics.”
- Explain Archimedes role in the development of hydraulics and related fluid sciences.
- Recognize the roles of the Egyptians and the Romans in the advancement of hydraulics.

13. Describe and explain Pascal’s Law and Bernoulli’s Principle. 30 Minutes

- Explain Pascal’s Law and how its effective for practical applications.
- Describe Bernoulli’s Principle and give an example.
- Recognize the density of common liquids.
- Examine the commonly used thermal properties of water.

14. Understanding and describe hydrostatic terms and requirements. Total Time 4 Hours
Numbers 14-16.

- A. Hydraulic Definitions
- B. Fluid Uses
- C. Hydraulic History
- D. Hydraulic Science
- E. Hydraulics in Today’s Applications and Uses

15. Explain and describe hydrostatics, liquids at rest, buoyancy and flotation, pressure on dams and submerged devices, and hydraulic presses. 160 Minutes

- Explain incompressibility of liquids.
- Interpret the application of hydraulic presses.
- Compare buoyancy and flotation.
- Describe liquids at rest.
- Analyze pressure on dams and other submerged devices.

16. Analyze and explain hydrodynamics, the study of liquids in motion. 80 Minutes

- Examine the speed of sound in water at various temperatures.
- Examine linear motion formulas.

Prerequisites: None

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.

Course Page Count Total

410 pages times 2 equals 820 divided by 60 minutes =13.6 hours

400 questions equals 6.60 hours

Total time 20.00 hours *We are asking for 20 hours of credit.*

**CEU was awarded based on guidelines established by the International Association of Continuing Education and Training (IACET).

Specific Course Goals and Timed Outcomes (Beta Testing)

One hundred students were invited to participate in this program and the average time necessary to complete each task was recorded. 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. All one hundred students were 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 90 days to complete this assignment and survey.

The student's objective was to read and complete the course and finish the assignment. They were also encouraged to review, edit, and improve the assessment, if possible. Tasks at all levels from 1 to the 4 licenses were reviewed.

Beta Testing Group Statistics (Short Summary)

One hundred students were selected for this assignment. All the students held wastewater treatment (36 students), water treatment (29 students), industrial (4 students), onsite installers (13 students), distribution operators (8 students), well drillers (7 students) and one student that held all these certifications. All the students held operator or similar positions with an average of 3 years of related experience. Nine students did not complete the reading assignment and surrendered. Thirty-four students failed the final examination. The average completion times were based upon the outcome of sixty students with an average score of 83.6 percent and an average of twenty-one hours to complete the work. The highest student scored 97 percent and the lowest passing score was 70 percent. The average complaint was the exam was too long, and too many questions. The course was reviewed and adjusted to provide ease for the student in finding specific areas. Rusty Randall Proctor, August 2012.

Final Conclusion

The average time for Pumps and Motors is 21.1 hours with an average score of 83.6 percent.

Beta Course Training/Assessment Survey Results

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

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

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.

**Course Author
Melissa Durbin**

This course was co-authored by Melissa Durbin; she has over 20 years of wastewater/water 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 wastewater treatment and related classes. She will be available to answer questions relating this course.

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.

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 20 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 water and wastewater treatment/pump/motor or related questions.

Course Complier

Peter Easterberg, Detail-oriented technical writer/technical editor/desktop publisher/copy editor. 17 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 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

Ongoing Course Evaluation

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

Course Procedures for Registration and Support

All of TLC's correspondence 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 or 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 or 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 number assigned to the student.

Instructions for Assignment

The Pumps and Motors CEU training course uses a multiple choice type answer key. You can find a copy of the answer key in the front of the assignment or in Word format on TLC's website under the Assignment Page. You can also find complete course support under the Assignment Page. You can write your answers in this manual or type out your own answer key. TLC would prefer that you type out and fax or e-mail the final exam to TLC, but it is not required.

Required Texts

The *Pumps and Motors* CEU training course will not require any other materials. This course comes complete. No other materials are needed.

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 basis and this information is secured and stored at a secure offsite location.

Mission Statement

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

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'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.

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.

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 of contents. The titles or names of subjects may be changed for readability purposes.

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.

Grading Criteria / 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.

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 is 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.

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.

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.

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.

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.

Environmental Terms, Abbreviations, and Acronyms

TLC provides a glossary that defines, in non-technical language, commonly used environmental terms appearing in publications and materials. It also explains abbreviations and acronyms used throughout the EPA and other agencies. You can find the glossary in the rear of the manual.

Recordkeeping and Reporting Practices

TLC will keep all student records for a minimum of seven years. It is your responsibility to give the completion certificate to the appropriate agencies. TLC will mail a copy to Indiana, Texas, or any other State that requires a copy from the Training Provider.

Credit/no credit option (P/Z) - None Available

Note to students: Keep a copy of everything 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 your instructor.

We expect every student to produce his or her original, 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 or he must contact the instructor and request an extension of her or 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. 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 email all concerns and the final test to info@tlch2o.com.

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 this particular group. Please check with your State for special instructions.

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 email all concerns and the final test to: info@tlch2o.com.

When the Student finishes this course...

At the finish of this course, the student should be able to explain and describe the various pumping devices, pumping methods, various electric motors, identify various hydraulic and horsepower principles that are commonly employed in moving fluids. Upon completion of this course, the student will obtain 20 hours of continuing education relating to pump, pumping and motor principles.

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 opportunities to apply and understand the theory and skills needed for operator certification and environmental education,

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.

The 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

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

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, s/he 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.

AFFIDAVIT OF EXAM COMPLETION

I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

Grading Information

In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

CUSTOMER SERVICE RESPONSE CARD

DATE: _____

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?

6. How about the price of the course?

Poor _____ Fair _____ Average _____ Good _____ Great _____

7. How was your customer service?

Poor _____ Fair _____ Average _____ Good _____ Great _____

8. Any other concerns or comments.
