

CEU COURSE DESCRIPTION

CHLORINATION 101 CEU TRAINING COURSE – 10 HRs

This is a 10 hour continuing education course covering chlorination in water and wastewater and general chlorine, disinfection and related sampling procedures.

Course Purpose

The main purpose of this course is to provide ten hours of continuing education in understanding various chlorination methods for disinfecting water. Unlike some of the other disinfection methods like ozonation and ultraviolet radiation, conventional chlorination is able to provide a residual to reduce the chance of pathogen regrowth in water storage tanks or within the water distribution system. At times, distribution systems can be a fair distance from the storage tanks and in dead end sections or where water is not used pathogens may re-grow if a proper (chlorine) residual is cannot be maintained in the treated water sent out for consumption. This results in poor water quality as well as slime and biofilms in the distribution systems that will end up contaminating the clean, treated water being distributed. We will also cover chlorination for wastewater treatment and general laboratory procedures.

Target Audience

The target audience for this course includes water distribution workers, well drillers, pump installers, water treatment operators, and wastewater (onsite) operators. Also included are people interested in working in a water treatment/wastewater treatment or distribution facility and/or wishing to maintain CEUs for a certification license or to learn how to perform their 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 need to be able to describe chlorination procedures and properly demonstrate proper and safe operation of various disinfectants for water and wastewater treatment.

General Learning Objectives

At the conclusion of the class, each participant will take a written examination and complete a course evaluation. Participants will have the opportunity to acquire knowledge of the following concepts.

Primary Overall Learning Course Goals and Timed Outcomes

1. Understand and describe various and conventional bacteriological sampling and monitoring. 50 minutes
2. Understand and describe Safe Drinking Water Act (SDWA). 20 minutes
3. Understand and describe various conventional modern water/wastewater treatment disinfectants. 60 minutes
4. Understand and describe various halogens and halides. 25 minutes
5. Understand and describe the history of chlorination. 10 minutes
6. Understand and describe waterborne diseases and viruses. 50 minutes
7. Understand and describe chlorine gas. 30 minutes
8. Understand and describe various chlorine basics. 50 minutes

9. Understand and describe chlorine exposure limits, residuals and related information.
10 minutes
10. Understand and describe sodium hypochlorite. 10 minutes
11. Understand and describe calcium hypochlorite. 10 minutes
12. Understand and describe chlorine-based disinfectants- Chloramines, and related oxidizers.
20 minutes
13. Understand and describe chlorination equipment and safety requirements. 20 minutes
14. Understand and describe chlorine health hazards. 20 minutes
15. Understand and describe chlorine dioxide. 20 minutes
16. Understand and describe water disinfection methods. 60 minutes
17. Understand and describe alternative chlorination methods for water/wastewater disinfection.
30 minutes

Detailed Learning Objectives

1. Understand and describe various and conventional bacteriological sampling and monitoring.

"Indicator" Organisms	Mycobacterium
Acute Risk to Health	Positive or Coliform Present Results
Fecal Coliforms and E. Coli	Proposed Rule Provisions and Rationale
Assessment and Corrective Action	Public Notice
Bacteria Sampling	Repeat
Burkholderia Pseudomallei	Routine
Coliform Bacteria	Routine Coliform Sampling
Coliform Testing	Special
Computing and Reporting	Total Coliforms, Fecal Coliforms, E. Coli
Francisella Tularensis	Transition to the RTCR
Helicobacter Pylori	Types of Water Samples
Heterotrophic Plate Count	Understanding Bacteria Sampling
Laboratory Analysis	Understanding Bacteriological Monitoring
Laboratory Procedures	Understanding Coliforms
Level 1 assessment	Understanding Positive or Coliform Present
Level 2 assessment	Results
Maximum Contaminant Levels (MCLs)	Violations and Public Notification

2. Understand and describe Safe Drinking Water Act (SDWA).

Adverse Effects	NDMA
Assimilable Organic Carbon (AOC)	Protozoa
Bacteria	Protozoan Diseases
Bromate	Risks and Benefits of Chlorine
Chlorine Disinfectants/Disinfectant By-Products (DBPs)	Stage 1 DBP Rule
Chlorine v. Chloramine	Stage 2 DBP Rule
Current EPA Research –Barriers to Contamination	THM Treatment
Disinfection Byproduct Regulations	Total Trihalomethanes
Disinfection Rules	Understanding Cryptosporidiosis
EPANET	Understanding Giardia lamblia
Haloacetic Acids (HAA5)	Understanding Waterborne Diseases
Microbial Regulations	Viruses
	Waterborne Pathogens

3. Understand and describe various conventional modern water/wastewater treatment disinfectants.

Bromate
Chloramine
Chlorine
Chlorine Dioxide
Disinfection Byproducts (DBPS)
Haloacetic Acids
Total Trihalomethanes

4. Understand and describe various halogens and halides.

Bromine
Chlorine
Fluorine
Iodine

5. Understand and describe the history of chlorination.

Chlorine Timeline
Chlorine Supplement Pre-Quiz
Chlorination Introduction
Drawbacks to Water Chlorination

6. Understand and describe waterborne diseases and viruses.

Campylobacter	Salmonella Typhi
Cryptosporidium	Sampling Procedures
Cryptosporidium and Giardia Analysis	Schistosomatidae
Disinfection of Water and Wastewater	Shigella Species
E-Coli Section	Streamwater Sample Collection
Emerging Pathogens	Understanding Bacteria
Giardia	Understanding Bacteriophage
Ground-Water Sample Collection	Understanding Oxidizing Agents
Hepatitis A	Understanding Protozoan Parasites
Legionella	Understanding Viruses
Microscopic Waterborne Agents	Vibrio Cholerae
Norovirus	Virions
Pseudomonas	Waterborne Pathogens
Salmonella species	

7. Understand and describe chlorine gas.

Chlorine Exposure Limits	Mechanism of Activity
Chlorine's Appearance and Odor	Pathophysiology
Disinfection Essentials	Reactivity
Early Response to Chlorine Gas	Solubility Effects

8. Understand and describe various chlorine basics.

Chlorine's Effectiveness	Chemical Oxygen Generation
Oxidation Chemistry	The Benefits of Chlorine
Understanding Disinfection	Potent Germicide
Wastewater Disinfection	Taste and Odor Control
Water Disinfection	Biological Growth Control
Residual Disinfection	Chemical Control
Chlorate Ion	Water Treatment
Chloride Ion	Water Distribution
Hypochlorites	The Challenge of Disinfection Byproducts
Disinfection Byproducts	Understanding Disinfection Byproducts
Trihalomethanes (THM)	Chemistry of Chlorination
Haloacetic Acids (HAA5)	Chlorine Review
Chloroform	Chlorine Demand
Sodium Chlorate	Chlorine Residual

9. Understand and describe chlorine exposure limits, residuals and related information.

Ammonia	Log Inactivation
Amperometric Titration	Onsite Hypochlorite Generation
Breakpoint chlorination	Post-chlorination
Chlorine Dose, Demand, and Residual	Pre-chlorination
Chlorine Residual Reagents	Preparation of Chemicals
Combined Chlorine Residual	Test Methods Available for Residual
CT and Log Inactivation Calculation	Total Chlorine Residual
DPD Colorimetric Method	Calculation and Reporting of CT Data
Free Chlorine	Understanding Chlorine Demand
Iodometric and Amperometric Methods:	Understanding Combined Chlorine Residual
Iodometric Method	

10. Understand and describe sodium hypochlorite.

Effectiveness of Shock Chlorination	Routes of Exposure
Incompatibilities	Salt Electrolysis System
Applications of Sodium Hypochlorite	Shock Chlorination — Well Maintenance
Inhalation	Sodium Hypochlorite Exposure
Recommendations for	Sodium Hypochlorite Solutions
Preparing/Handling/Feeding	Troubleshooting Hypochlorination Problems

11. Understand and describe calcium hypochlorite.

Comparison	Safety
Corrosion	Storage and Distribution
Effectiveness	

12. Understand and describe chlorine-based disinfectants- Chloramines, and related oxidizers.

Chloramine Advantages	Oxidizing Agents
Chloramine Disadvantages	Phenolics
Chloramine Section	Quaternary Ammonium Compounds
Dichloramine	Silver
Monochloramine	Trichloramine

13. Understand and describe chlorination equipment and safety requirements.

Access	Scrubbers
Capacity	Securing Cylinders
Chlorine Leak Detection	Standby Provision
Chlorine Room Design Requirements	Storage of Chlorine Cylinders
Heating	Ventilation
Methods of Control	Weigh Scales
Safety Equipment	

14. Understand and describe chlorine health hazards.

ABC Reminders	Emergency Response Contingency Plans
Victim Removal	Evacuation and Emergency Procedures
Decontamination Zone	Exposure Sources and Control Methods
Rescuer Protection	Eye
ABC Reminders	Eye/Skin Contact
Basic Decontamination	General Planning Considerations
Transfer to Support Zone	Ingestion
Support Zone	Inhalation
ABC Reminders	Leak Procedures
Additional Decontamination	Major Leak
Advanced Treatment	Minor Leak
Transport to Medical Facility	Pre-hospital Management
Multi-Casualty Triage	Hot Zone
Routes of Exposure	Rescuer Protection
Chemical Spill Procedure Example	Respiratory Protection
Chronic	Signs and Symptoms of Exposure
Emergency Medical Procedures	

15. Understand and describe chlorine dioxide.

Chlorine Dioxide Advantages	First Aid and Treatment
Chlorine Dioxide Disadvantages	Reactive Chemical Hazards

16. Understand and describe water disinfection methods.

Chemical Methods	Photo-Inactivation
Chlorination and Dechlorination	Physical Methods
Household Methods	

17. Understand and describe alternative chlorination methods for water/wastewater disinfection.

Alternate Disinfectants Summary	Photoelectric Cell
Chloramines	Strongest Oxidizing Agent
Chlorine Dioxide	Ultraviolet Disinfection
Ozone	Ultraviolet Radiation Advantages
Ozone Advantages	Ultraviolet Radiation Disadvantages
Ozone Disadvantages	Unknown Factors Associated with
Ozone Section	Alternatives

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 primarily 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.

Specific Course Goals and Timed Outcomes (Beta Testing)

Initial Beta Testing 2005. Chlorination 404, 303, 202, 101 Original Master Course

Twenty students were given a task assignment survey in which to track their times on the above learning objectives (course content) and utilized a multiple-choice style answer sheet to complete their final assignment. All students were given 30 days to complete this assignment and survey. Twenty students were selected for this assignment. Thirteen of the students held water distribution or water treatment operator certification positions, and seven students were wastewater treatment operators. Fourteen out of twenty students were successfully tested. None of the test group received credit for their assignment. Six students failed the final examination. All of the students completed the reading assignment. All of the wastewater treatment operators passed the assignment. The average times were based upon the outcomes of the fourteen students who passed. Rusty Randall, Proctor, February 2005

Second Beta Testing and Course Adjustment

In the subsequent time, fifty water/wastewater operator students were selected to complete the assignment and the completion statistics are as follows: 78 percent passing rate with an overall average score of 82 percent within a 90-day assignment completion period. The primary student response was the assignment was too difficult and too long. The average time necessary to complete each task was recorded as stated in the above objectives and timed outcome section. The tasks were measured using times spent on each specific objective goal and final assignment grading of 70% and higher. The student survey was utilized to work out all problems in the assignment and was utilized for course corrections. Rusty Randall, Proctor, July 2012

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

Course Page Count Total

1 page of text = 2 minutes of student time.

1 exam question = 1 minute of student time

300 pages times 2 equals 600 divided by 60 minutes = 10 hours

200 questions equals 3.33 hours

Total time 13.33 hours We are asking for 10 hours of credit.

Beta 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



Melissa Durbin, Author and Dean of Instruction.

30 years' experience in water disinfection training along with 18 years of college instruction. I have taught this course to hundreds of students and still learn more each day about microorganisms. Call me or any of the other Instructors for course assistance. I welcome your input and comments and hope you enjoy this course.

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 Department of Environmental Protection (PDEP) and the Association of Boards of Certification (ABC).

TLC has primarily 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.

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.

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 25 years of 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. 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 25 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 disinfection or chlorination.

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 (S.M.E. and Technical Writers. 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.

Course Compiler

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 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 the Course Editor or Copyeditors for evaluation and course corrections. 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.

Editor's Discretion

The Course Editor may change the course assessment (assignment), course text, objective, artwork and topical order as necessary for security, corrective, printing, readability or typesetting purposes. The assessment may be rotated for security purposes and the course material may be updated to reflect any regulatory updates and/or corrections. The overall course objective or topic guide may be in a different order than the course manual for the reason of typesetting, adult learning principles and copy-editing purposes. Course materials, charts and artwork amendments, adjustments, modifications may be performed to reflect regulatory/safety text/artwork updates, Bloom's taxonomy, adult learning principle changes, error adjustments and comprehension. These changes generally do not reflect major course material changes, but are minor in nature

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/online 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. Some students will be tracked and reported by their operator ID for any required state agency.

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.

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.

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.

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.

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 the registration page and assignment has been received and graded.

Instructions for Written Assignments

The Chlorination 101 training CEU course uses multiple choice and true/false 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, but they may be faxed to (928) 468-0675.

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 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.

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 any required state agency 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).

Final Assignment

The final examination assignment is determined by the examination administrator or the instruction 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.

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 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 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 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.

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.

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.

Educational Mission

- *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.*

When the Student finishes this course...

At the finish of this course, the student shall explain and describe the Safe Drinking Water Act (SDWA) and various conventional modern water/wastewater treatment disinfectants. The student will examine and understand various halogens and halides, History of chlorination, waterborne diseases and viruses. The student will cover Chlorine gas in great detail including: Chlorine exposure limits, residuals and related information, Sodium hypochlorite, Calcium hypochlorite, Chlorine-based disinfectants- Chloramines, and related oxidizers. The student will cover Chlorination equipment and safety requirements, Chlorine health hazards. The student will cover alternative chlorination methods for water/wastewater disinfection, Chlorine dioxide and conventional bacteriological sampling and monitoring.

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

Affidavit

State Requirements- Each State has 1 or more of these requirements.

Photo Identification

We will require a photocopy of your driver's license or official government ID to verify your identity. You can upload a copy of your driver's license or other official ID to this computer program or submit a photo copy with your assignment. You can take a photo of your ID with your cell phone and upload the photo. No certificate of completion or reporting to the State will be issued until we receive your identification.

Proctoring Report

If your State requires a proctoring report, we have a copy on this site for you to download and provide to your proctor. If you are unsure if you need a proctoring report, contact your State Agency or email us. Info@tlch2o.com You can also upload the report to us in this computer program.

Security and Disclaimer Affidavit

You must agree to the terms below before moving forward.

I understand that I am 100 percent responsible to ensure that this course is approved and/or accepted for credit by my State Agency. I understand that TLC has a zero tolerance towards not following their rules, cheating or hostility towards staff or instructors. I need to complete the entire assignment for credit. There is no credit for partial assignment completion. I will provide an official government ID card to verify my identity.

Some States require your computer camera to be on during the training program to ensure that you alone are completing the work.

If necessary by my State agency, my exam was proctored. I will contact TLC if I do not hear back from them within 2 days of final exam submission. I will forfeit my purchase costs and will not receive credit or a refund if I do not abide with TLC's rules. I will not hold them liable for any misinformation or any injury. I will allow TLC to email and/or call me.

You can take breaks between the text reading assignments and quizzes.

You can take notes.

You will need to pass the quizzes with 100% and the final exam with 70%.

There is a customer survey at the end of the program.

By clicking the next button, you will agree to these terms.

CERTIFICATION OF COURSE PROCTOR

Technical Learning College requires that our students who takes a correspondence or home study program course must pass a proctored course reading, quiz and final examination. The proctor must complete and provide to the school a certification form approved by the commission for each examination administered by the proctor.

Instructions. When a student completes the course work, fill out the blanks in this section and provide the form to the proctor with the examination.

Name of Course: _____

Name of Licensee: _____

Instructions to Proctor. After an examination is administered, complete and return this certification and examination to the school in a sealed exam packet or in pdf format.

I certify that:

1. I am a disinterested third party in the administration of this examination. I am not related by blood, marriage or any other relationship to the licensee which would influence me from properly administering the examination.
2. The licensee showed me positive photo identification prior to completing the examination.
3. The enclosed examination was administered under my supervision on _____. The licensee received no assistance and had no access to books, notes or reference material.
4. I have not permitted the examination to be compromised, copied, or recorded in any way or by any method.
5. Provide an estimate of the amount of time the student took to complete the assignment.

Time to complete the entire course and final exam. _____

Notation of any problem or concerns:

Name and Telephone of Proctor (please print):

Signature of Proctor

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.
