

## **CEU COURSE DESCRIPTION**

### **TERTIARY TREATMENT CEU TRAINING COURSE – 1.8 Hours**

This CEU course is a review of advanced biological control technologies and techniques currently applied and emerging at municipal wastewater treatment plants (WWTP) and for septic systems. This course will describe biological Nitrogen and Phosphorus removal techniques and combination processes found in septic/treatment systems. This course will also cover the principles behind biological treatment to remove phosphorus and treatment configurations that can remove both phosphorus and nitrogen from wastewater and septic systems. This course will describe several wastewater treatment processes, provide guidance on how to choose among them, and describe operational and design considerations including the COD:P ratio, retention time, and temperature. This course is general in nature and not state specific but will contain different wastewater treatment methods, policies and ideas. You will not need any other materials for this course.

#### **Intended Audience**

This CEU course is intended for Wastewater Treatment, Collections and Pretreatment/Industrial Waste Inspectors. The target audience for this course is the person interested in working in a wastewater treatment or collections facility and wishing to maintain CEUs for a certification license or to learn how to do the job safely and effectively, and/or to meet education needs for promotion.

**Prerequisites:** None

#### **Required Texts**

The Tertiary Treatment CEU course CEU training course comes complete, no other materials are necessary.

#### **General Course Learning Goals**

1. Activated sludge processes.
2. Operations and components of clarifiers including secondary clarification.
3. Preliminary treatment operation.
4. Problems relating to Phosphorus.
5. Various types of Nitrogen.
6. EPA wastewater rules and regulations.
7. Operations and components of processing solids.
8. Wastewater Analyses and other laboratory procedures.
9. Wastewater treatment water quality criteria including microorganisms (bugs) used along with the terminology and formulas to determine their performance.
10. Wastewater treatment water quality criteria including microlife, microorganisms in lagoons, nitrification, algae Groups and formulas to determine their performance.
11. Problems found in the clarifiers and possible corrective measures.
12. Various WWT treatment processes and results.
13. Various effects of WWT nutrients and nutrient removal processes.
14. Various effects of WWT pollutants.
15. Basic system components of a wastewater treatment facility.

## **CEU Course Learning Objectives and Timed Outcomes**

1. The student will describe different activated sludge processes. 175 minutes
2. The student will describe operations and components of clarifiers including Secondary clarification. 115 minutes.
3. The student will describe preliminary treatment operation. 115 minutes
4. The student will describe the various forms and problems relating to Phosphorus. 65 minutes.
5. The student will describe various describe the results and various types of Nitrogen. 65 minutes.
6. The student will describe various EPA wastewater rules and regulations. 25 minutes.
7. The student will describe various the operations and components of processing solids. 115 minutes.
8. The student will describe various Wastewater Analyses and other laboratory procedures. 125 minutes.
9. The student will describe wastewater treatment water quality criteria including microorganisms (bugs) used along with the terminology and formulas to determine their performance. 120 minutes
10. The student will describe wastewater treatment water quality criteria including microlife, microorganisms in lagoons, nitrification, algae Groups and formulas to determine their performance. 135 minutes
11. The student will describe various problems found in the clarifiers and possible corrective measures. 130 minutes.
12. The student will describe various WWT treatment processes and results. 110 minutes.
13. The student will describe various effects of WWT nutrients and nutrient removal processes. 45 minutes.
14. The student will describe various effects of WWT pollutants. 35 minutes.
15. The student will describe the basic system components of a wastewater treatment facility. 135 minutes

## Detailed CEU Course Learning Goals

### 1. Describe the different activated sludge processes.

Define Complete Mix Activated Sludge Process.	Define Oxidation Ditch Activated Sludge Process.
Define Contact Stabilization Activated Sludge Process.	Define Plug Flow Activated Sludge Process.
Define Extended Aeration Activated Sludge Process.	Define Process design.
Define High Purity Oxygen Activated Sludge Process.	Define Step Feed Activated Sludge Process.

### 2. Describe the operations and components of clarifiers including secondary clarification.

Diffused, mechanical, and submerged.  
Understanding aeration.  
Understanding operation of the secondary clarifier.

### 3. Describe the preliminary/primary treatment operation.

Diffused, mechanical, and submerged.  
Understanding aeration.  
Understanding operation of the primary clarifier.

### 4. Describe the various forms and problems relating to Phosphorus.

Total Phosphorus	Examine various forms and compounds.
Polyphosphate	Examine Phosphorus removal processes.
Phosphate Accumulating Organism Process	Enhanced Biological Phosphorus Removal Process
Phosphate (also called Orthophosphate)	
Organically bound phosphorus.	

### 5. Examine and describe various describe the results and various types of Nitrogen.

Total Nitrogen	Nitrite (NO <sub>2</sub> -)
Total Kjeldahl Nitrogen	Nitrate (NO <sub>3</sub> -)
Single Reactor High-activity Ammonia Removal Over Nitrite	Inert Dissolved Organic Nitrogen Process
Simultaneous Nitrification-Denitrification	Examine various forms and compounds.
Sequencing Batch Reactors	Examine Nitrate and Ammonia removal processes.
Recalcitrant Dissolved Organic Nitrogen	Dissolved Organic Nitrogen Process
Organic nitrogen	Ammonium ion (NH <sub>4</sub> +) )

### 6. Examine and describe various EPA wastewater rules and regulations.

CWA            NPDES

### 7. Examine and describe various the operations and components of processing solids.

Solids Retention Time

**8. Examine and describe various Wastewater Analyses and other laboratory procedures.**

Water Quality Trading  
Volatile Fatty Acids  
Total Suspended Solids  
Total Maximum Daily Loads  
Total Dissolved Solids  
PAX  
Microthrix  
Contact Stabilization  
Complete Mix Process  
Chemical Oxygen Demand Test  
Chemical  
Biological Aerated Filter  
Biochemical Oxygen Demand Test  
Biochemical Oxygen Demand (5-day) Test  
Bacteria Examination  
Activated Sludge Methods

**9. Examine and describe wastewater treatment water quality criteria including microorganisms (bugs) used along with the terminology and formulas to determine their performance.**

Ammonia Oxidizing Bacteria	Nocardia
Filamentous Bacteria	Nocardia amarae
H. hydrossis	Nostocoida limicola I and II
Microthrix parvicella	Sphaerotilus natans
Nitrite Oxidizing Bacteria	Thiothrix I and II

**10. Examine and describe wastewater treatment water quality criteria including microlife, microorganisms in lagoons, nitrification, algae Groups and formulas to determine their performance.**

Acid-forming bacteria	Methane forming bacteria
Aerated lagoons	Microcystis
Aerobic Bacteria	Microinvertebrates
Anabaena	Oscillatoria
Anaerobic Bacteria	Photosynthetic Organisms
Aphanothece	Protozoans
Blue-Green Bacteria	Rotifer
Daphnia	Thermophilic bacteria
Facultative lagoons	

**11. Examine and diagnose various problems found in the clarifiers and possible corrective measures.**

Basic Process Goals  
Biological control  
Chemical addition  
RAS  
WAS

**12. Examine and understand various WWT treatment processes and results.**

3 Stage Pho-redox Process	Examine Mechanical Applications
Activated Sludge	Examine MLVSS
Aeration Tank 3 Process	Membrane Bioreactor Process
Ballasted High Rate Clarification Processes	Modified Ludzack Ettinger Process
Bio-Augmentation Batch Enhanced Process	Nitrification
Biochemical Oxygen Demand (5-day) Test	Pho-redox Process
Biochemical Oxygen Demand Test	Pretreatment
Biological Aerated Filter	RAS/WAS
Chemical Oxygen Demand Test	Recirculating Sand Filters
Collections system	Rotating Biological Contactor
Denitrification	Total Dissolved Solids
Dissolved Air Flotation Process	Total Maximum Daily Loads
Examine Aeration	Total Suspended Solids
Examine Chemical Addition	Volatile Fatty Acids

**13. Understand various effects of WWT nutrients and nutrient removal processes.**

Single Reactor High-activity Ammonia Removal Over Nitrite  
Simultaneous Nitrification-Denitrification  
Sequencing Batch Reactors  
Recalcitrant Dissolved Organic Nitrogen  
Organic nitrogen  
Nitrite (NO<sub>2</sub><sup>-</sup>)  
Nitrate (NO<sub>3</sub><sup>-</sup>)  
Inert Dissolved Organic Nitrogen Process  
Examine various forms and compounds.  
Examine Nitrate and Ammonia removal processes.  
Dissolved Organic Nitrogen Process

**14. Understand various effects of WWT pollutants.**

Acid-forming bacteria	Methane forming bacteria
Aerated lagoons	Microcystis
Aerobic Bacteria	Microinvertebrates
Ammonia Oxidizing Bacteria	Microthrix parvicella
Anabaena	Nitrite Oxidizing Bacteria
Anaerobic Bacteria	Nocardia
Aphanothece	Nocardia amarae
Blue-Green Bacteria	Nostocoida limicola I and II
Daphnia	Oscillatoria
Facultative lagoons	Photosynthetic Organisms
Filamentous Bacteria	Protozoans
H. hydrossis	Rotifer

**15. Understanding the basic system components of a wastewater treatment facility.**

Aeration	Biodegradable Fraction of Dissolved
Bio-Augmentation Batch Enhanced Process	Organic Nitrogen Process
Bio-Augmentation Regeneration/Reaeration Process	Biological Aerated Filter
Biochemical Oxygen Demand (5-day) Test	Biological Chemical Phosphorus and
Biochemical Oxygen Demand Test	Nitrogen Removal Process
	Biological Nutrient Removal Process

Biological Phosphorus Removal Process  
Chemical Oxygen Demand Test  
Collections system  
Denitrification  
Dissolved Air Flotation Process  
Examine Chemical Addition

Examine Mechanical Applications  
Membrane Bioreactor Process  
Modified Ludzack Ettinger Process  
Nitrification  
Troubleshooting upsets and related issues

### **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. (Not including the page count of the Assessment)  
1-word quiz/exam question = 1 minute of student time.

500 pages times 2 equals 1000 divided by 60 minutes = 16.6 hours

400 questions equals 6 hours

***We are asking for 18 hours of credit.***

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

Twenty-five students were tested and the average time necessary to complete each task was recorded as the stated in the above objectives and timed outcome section. In the above timed outcome section area, the tasks were measured using times spent on each specific objective goal and final assignment grading of 70% and higher. All students were given 30 days to complete this assignment and survey. The students scored an average of 84 percent passing. Rusty Randall Proctor, December 2008

### **Beta Testing Group Statistics**

Twenty-five students were selected for this assignment. All the students held wastewater treatment operator certification positions. The students held chemistry and biology degrees and easily passed this course. Most of the other students had an average of a twelfth grade education and were the basis for the timed outcomes. Seven students failed the final examination. Two students did not complete the reading assignment. The average times were based upon the outcome of eighteen students. The average time for course completion was twenty-one hours.

### **Timed Averages**

Students have reported the following time burden for successful completion of this distance learning course to be estimated to average of 19 hours per response per completed assignment or final examination. The timed burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing of the final assignment and passing the assignment with a score of 70% or better.

## Beta Course Training/Assessment Short Summary

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 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. 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. 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.

### **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.

**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 safety, water/wastewater treatment, disinfection 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 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 this course or material.

**Course Complier**

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

### **Contributing Editors**

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

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

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

### **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 or copy editing purposes. Course materials, charts and artwork amendments, adjustments, modifications may be performed to reflect regulatory/safety text/artwork updates, 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, 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 required state agencies.

### **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.

### **Final Examination for Credit**

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

### **Flexible Learning**

At TLC, there are no scheduled online sessions you need contend with, nor are you required to participate in learning teams or groups designed for the typical younger campus-based student. You will work at your own pace, completing assignments in time frames that work best for you. TLC's method of flexible individualized instruction is designed to provide each student the guidance and support needed for successful course completion.

We will beat any other training competitor's price for the same CEU material or classroom training. Student satisfaction is guaranteed.

### **Course Structure**

TLC's online courses combine the best of online delivery and traditional university textbooks. You will find the course syllabus, course content, assignments, and open book exams online. This student-friendly course design allows you the most flexibility in choosing when and where you want to study.

### **Classroom of One**

TLC offers you the best of both worlds. You learn on your own terms and your own time, but you are never on your own. Once enrolled, you will be assigned a personal student service representative who works with you on an individualized basis throughout your program of study. Course specific faculty members are assigned at the beginning of each course providing the academic support you need to successfully complete each course.

### **Written Assignment Instructions**

The Tertiary Treatment CEU training course uses a multiple choice style answer key. 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 assignment to TLC, but it is not required.

### **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 result in forfeiture of all fees and the appropriate agency will be notified.

### **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.

### **Required Texts**

The Tertiary Treatment CEU training course will not require any other materials. This course comes complete.

### **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 and Appendix at <http://www.abctlc.com/downloads/PDF/WWTGlossary.pdf>

### **Educational Learning Objective Topics**

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

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

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

### **Student Concerns**

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

## **Recordkeeping and Reporting Practices**

TLC keeps all student records for a minimum of five years. It is the student's responsibility to give the completion certificate and/or paperwork to the appropriate government agencies. If necessary, we will electronically submit the required information to 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).

## **Grading Criteria**

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

## **Final Assignment**

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

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

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

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

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

### **Proctoring Instructions**

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

### **PROCTORS, *If Necessary...***

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

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

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

- **College or University Personnel:** Dean, Department Chair, Student Records, Professional Staff Member of an adult/continuing education office or counseling center, Librarian, Professor, or any official testing center personnel if the tests are administered in the center.
- **Armed Forces Education Office Personnel**
- **Public or Private School Personnel:** Superintendent, Principal, Guidance Counselor, or Librarian.
- **Other:** Civil Service Examiner, Librarian for City/County, HR Professional, or Education/Training Coordinator.

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

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

### **Nominating a Proctor**

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

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

### **Proctor Nomination Form**

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



**Disclaimer Notice**

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

**Affidavit of Exam Completion**

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

**Refund Policy**

We will beat any other training competitor's price for the same CEU material or classroom training. Student satisfaction is guaranteed. We will refund course fees if the course is not accepted for credit by the State. Otherwise, any other problem will be given an exchange credit towards an acceptable or approved course for the State. Once we are notified of the refund or exchange, we will generally issue a refund in 30 days of the problem and exchange within the same day.

**Continuing Education Units**

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

**Mission Statement**

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

**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. Alternative assignment is available. Note to students: 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.

**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](mailto:info@tlch2o.com).

**Course Objective:** To provide 20 hours of continuing education training in advanced wastewater treatment methods pertaining to removing wastewater nutrients and understanding various wastewater treatment methods.

### **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,

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

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

**At the conclusion of this course:**

At the finish of this course, you (the student) should be able to explain and describe various treatments and methods of dealing with Phosphorus and Nitrogen including activated sludge methods and explain wastewater treatment sampling techniques and biological monitoring, microbe (bug) identification and microorganism control methods for both septic and conventional treatment. Describe biological Nitrogen and Phosphorus removal techniques and combination processes. Describe the principles behind biological treatment to remove phosphorus and treatment configurations that can remove both phosphorus and nitrogen from wastewater. Describe descriptions of several processes, provide guidance on how to choose among them, and describe operational and design considerations including the COD:P ratio, retention time, and temperature.

Upon completion of this course, the student will obtain 18 hours of continuing education relating to wastewater treatment and nitrogen and phosphorus control technologies and techniques currently applied and emerging at municipal wastewater treatment plants (WWTP) and in septic systems.

## **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?

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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.

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