

## **DETAILED COURSE DESCRIPTION**

### **ACTIVATED SLUDGE CEU TRAINING COURSE – 20 hours**

This CEU course is a review of activated sludge wastewater treatment methods and related subjects. This course is general in nature and is not state specific, but contains different wastewater treatment methods, clarification, and correction methods.

This CEU course will cover the conventional wastewater treatment process, related components, chemicals and processes. The course will cover the wastewater primary and secondary clarification process including oxidation ditches and activated sludge processes (RAS, WAS). We will examine the requirements for wastewater water quality criteria including nitrogen and phosphorus removal and advanced wastewater treatment methods and related process goals.

This course will closely examine related wastewater bacteria and related microorganisms. The student will also be required to identify common wastewater compliance monitoring and wastewater sampling techniques.

#### **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.

#### **Statement of Need**

All certified wastewater operators need to know the basic requirements of the Clean Water Act and how to properly treat wastewater to outfall and/or NPDES requirements. This course will cover the essentials of proper conventional wastewater treatment including proper sampling techniques and report requirements.

#### **General Objective**

To provide awareness in effective and efficient wastewater activated sludge methods and generally accepted wastewater treatment methods.

#### **Course Goals**

- Topic 1 – Wastewater Introduction
- Topic 2 – Primary Wastewater Treatment Section
- Topic 3 - Secondary Treatment Section
- Topic 4 - Activated Sludge Process Section
- Topic 5 – Nutrient Section
- Topic 6- Wastewater Microbiology Section
- Topic 7 -Wastewater Sampling Section
- Topic 8- Laboratory Analysis/ Process Control Section

**Education Provider Information**

Technical Learning College  
Contact Person Melissa Durbin  
PO Box 3060  
Chino Valley, AZ 86323  
Toll Free (866) 557-1746  
Fax (928) 468-0675

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**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.

## **General Learning Objectives**

### **Topic 1 – Wastewater Introduction**

**Topic 1 - Section Focus:** You will learn the basics of the Clean Water Act, the need for wastewater treatment and common wastewater constituents. At the end of this section, you the student will be able to describe the need for wastewater treatment and the composition/components of wastewater. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

### **Topic 2 – Primary Wastewater Treatment Section**

**Topic 2 - Section Focus:** You will learn the basics of the primary wastewater treatment process. At the end of this section, you the student will be able to describe primary wastewater treatment process. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

### **Topic 3 - Secondary Treatment Section**

**Topic 3 - Section Focus:** You will learn the basics of the secondary wastewater treatment process and related subjects. At the end of this section, you the student will be able to describe the process for wastewater to achieve a certain degree of effluent quality by using a sewage treatment plant with physical phase separation to remove settleable solids and a biological process to remove dissolved and suspended organic compounds. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

### **Topic 4 - Activated Sludge Process Section**

**Topic 4 - Section Focus:** You will learn the basics of the activated sludge process. At the end of this section, you the student will be able to describe the activated sludge process and various treatment methods. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

### **Topic 5 – Nutrient Section**

**Topic 5 – Section Focus:** You will learn the basics of wastewater nutrients, including nitrogen, phosphorus and removal procedures. At the end of this section, you the student will be able to describe various wastewater nutrients and removal methods. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

### **Topic 6- Wastewater Microbiology Section**

**Topic 6 - Section Focus:** You will learn the basics of the Microlife that lives in wastewater. At the end of this section, you the student will be able to describe various wastewater Microlife and bacteria. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

### **Topic 7 -Wastewater Sampling Section**

**Topic 7 - Section Focus:** You will learn the basics of the wastewater sampling program, rules, and sampling procedures. At the end of this section, you the student will be able to describe various sampling regulations and sampling procedures. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

## **Topic 8- Laboratory Analysis/ Process Control Section**

**Topic 8 - Section Focus:** You will learn the basics of the wastewater laboratory analysis and process control procedures. At the end of this section, you the student will be able to describe general laboratory analysis procedures. There is a post quiz at the end of this section to review your comprehension and a final examination in the Assignment for your contact hours.

### **Specific Learning Objectives**

#### **Topic 1 – Wastewater Introduction**

**Topic 1 – Scope/Background:** Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry. EPA has also developed national water quality criteria recommendations for pollutants in surface waters.

Permit Introduction-CRAO&WQ

Biological Oxygen Demand Introduction-CRAO&WQ

Process Introduction –TECH & M/O

Wastewater Quality Characteristics- TECHNICAL&WQ

Conventional Wastewater Treatment Introduction

Effects of WWT Pollutants- CRAO&WQ

Primary Wastewater Components-CRAO&WQ

Oil and Grease Introduction- TECHNICAL&WQ

Inorganics-CRAO&WQ

Solids – CRAO & TECH

Hydrogen Sulfide and Ammonia– WQ & TECH

Oxygen Demanding Pollutants- TECHNICAL&WQ&CRAO

Thermal Effects- TECHNICAL&WQ

Biological Components- TECHNICAL&WQ

Post Quiz

#### **Topic 2 – Primary Wastewater Treatment Section**

**Topic 2 – Scope/Background:** Primary treatment of wastewater involves sedimentation of solid waste within the water. This is done after filtering out larger contaminants within the water. Wastewater is passed through several tanks and filters that separate water from contaminants. The resulting “sludge” is then fed into a digester, in which further processing takes place. This primary batch of sludge contains nearly 50% of suspended solids within wastewater.

Plant Overview- TECHNICAL

Grit Chamber- TECHNICAL

Conventional Treatment- TECHNICAL

Sampling Effluent Introduction-CRAO&WQ

Influent Flow Section-CRAO&WQ

Preliminary Treatment Section - TECHNICAL

Primary Clarifier- TECHNICAL

Clarifier Operation- TECHNICAL

Secondary Clarification - TECHNICAL

COD:P Ratio- TECHNICAL

Retention Time- TECHNICAL

Scum Removal- TECHNICAL

Struvite Problem- TECHNICAL

Operational Issues-CRAO&WQ

Soilds Section-CRAO&WQ

Post Quiz

### **Topic 3 - Secondary Treatment Section**

**Topic 3 – Scope/Background:** The United States Environmental Protection Agency (EPA) defined secondary treatment based on the performance observed at late 20th-century bioreactors treating typical United States municipal sewage. Secondary treated sewage is expected to produce effluent with a monthly average of less than 30 mg/l BOD and less than 30 mg/l suspended solids. Weekly averages may be up to 50 percent higher. A sewage treatment plant providing both primary and secondary treatment is expected to remove at least 85 percent of the BOD and suspended solids from domestic sewage. The EPA regulations describe stabilization ponds as providing treatment equivalent to secondary treatment removing 65 percent of the BOD and suspended solids from incoming sewage and discharging approximately 50 percent higher effluent concentrations than modern bioreactors.

Ponds and Lagoons Introduction- M/O

Aerobic Process- M/O

Facultative Pond- M/O

Fixed-Film Systems- M/O

Rotating Biological Contactors- TECH & M/O

Low Rate Filters- TECH & M/O

Aeration Section- TECH & M/O

Large Air Diffusers- TECH & M/O

Blowers- TECH & M/O

Diffuser Layouts- TECH & M/O

Advanced Treatment Method Introduction- TECH & M/O

Fuzzy Filters- TECH & M/O

Oxidation Ditches - TECH & M/O

Reactor- TECH & M/O

Lagoon Microorganisms - M/O

Mixed or Suspended Lagoons- M/O

Algae- M/O

Lagoon pH and Alkalinity- M/O&WQ

Post Quiz

### **Topic 4 - Activated Sludge Process Section**

**Topic 4 – Scope/Background:** Activated sludge (A/S) is a term used both to refer to a widely utilized wastewater treatment process, and to the solid compounds which result from that process. The activated sludge technique is one of the most commonly used methods for handling human waste in municipal settings around the world, and it can also be employed in the treatment of industrial wastewater. The goal is to remove as much solid organic material from the wastewater as possible, to facilitate further stages in the water treatment.

Activated Sludge Introduction- M/O

Mixed Liquor Introduction- M/O

Desired Effluent-CRAO&WQ

Anaerobic Bacteria- TECH & M/O

Groups of Microorganisms- M/O

System Components- TECH & M/O

Complete Mix Process- TECH & M/O

Plug Flow- TECH & M/O

Contact Stabilization- TECH & M/O

Step Feed- TECH & M/O

Extended Aeration- TECH & M/O

High Purity Oxygen- TECH & M/O

Activated Sludge Organic Load Methods - TECH & M/O

Sludge Section- TECH & M/O  
Return Rates- TECH & M/O  
RAS/WAS System Summary - M/O  
Post Quiz

### **Topic 5 – Nutrient Section**

**Topic 5 – Scope/Background:** This section provides information on a number of different technologies that can reduce nitrogen and phosphorus levels. The actual technology selected will be site-specific and dependent on many factors including soil conditions, influent water quality, required effluent levels, disposal options, availability of land, cost, etc.

Nutrient Introduction-CRAO&WQ  
Nitrogen Introduction- M/O&CRAO  
Nitrate to Nitrogen Gas - TECHNICAL  
Carbon Absorption - TECHNICAL  
Nitrification and Nutrient Removal-CRAO&WQ  
Initiatives to Reduce Nutrients - TECHNICAL  
Nitrogen and Phosphorus Removal- M/O&CRAO  
Sequencing Batch Reactors- TECHNICAL  
Recirculating Sand Filters - TECHNICAL  
Natural Systems- TECHNICAL  
Water Quality Trading-CRAO&WQ  
Nutrient Constituents and Measurements- TECHNICAL  
Denitrification Bacteria- M/O  
Four- Stage Bardenpho Process- TECHNICAL  
Phosphorus Section- M/O&CRAO  
Phosphorus Removal- M/O&CRAO  
Chemical Feeding- TECHNICAL  
Ammonia-CRAO&WQ  
Advanced Solids- M/O&CRAO  
Biological Nitrogen Removal- TECH & M/O  
Biological Phosphorus Removal- TECH & M/O  
Pho-Redox (A/O) -TECH  
Hybrid Chemical/Biological Processes-TECH  
Post Quiz

### **Topic 6- Wastewater Microbiology Section**

**Topic 6 – Scope/Background:** Wastewater Microbiology focuses on microbial contaminants found in wastewater, methods of detection for these contaminants, and methods of disinfecting water of microbial contamination. Microbiological analysis of activated sludge systems, lagoons, filters or any biological treatment process is an invaluable tool for troubleshooting and suggesting effective remedial actions for wastewater treatment issues.

Water Quality Criteria – M/O&CRAO  
Genera- M/O  
Microlife Food to Mass- M/O  
Bacteria Section- M/O  
Facultative Bacteria- M/O  
Protozoans - M/O  
Process Indicators M/O  
Filamentous Bacteria- M/O  
Bacteria Growth Terms – M/O  
Activated Sludge Specific Bugs – M/O

Vorticella– M/O  
Euchlanis– M/O  
Indicator Organisms- M/O  
Aerobic flocs -. M/O  
Filamentous Identification - M/O  
Thiothrix- M/O  
Microthrix- M/O  
Microthrix Capabilities - M/O  
PAX- M/O  
Sphaerotilus natas- M/O  
Thiothrix- M/O  
Post Quiz

### **Topic 7 -Wastewater Sampling Section**

#### **Topic 7 – Scope/Background:**

The sampler should be thoroughly familiarized with existing safety guidelines and follow your permit and proper sampling procedures, guidelines and practices for any analyte of particular interest. The sampler must always be alert to the possibility of danger, especially in dealing with unknown sites, situations or possible contaminants. Legal samples are necessary for process control and for when there is evidence an individual or company has not complied with wastewater regulatory requirements and there is a potential for laying charges. Legal sampling is conducted under the following circumstances: Any known or suspected violation, Spills or environmental accidents, Previous knowledge about compliance history does not exist or it is unknown. From the standing point of objectivity, continuity of evidence and quality of the results, the collection, handling, transport, analysis, storage and disposal of the legal samples must be defensible.

Common Sampling Bottles-CRAO&WQ  
Procedural Precautions-CRAO&WQ  
Site Selection-CRAO&WQ  
Compliance and Monitoring-CRAO&WQ  
QA/QC Sampling-CRAO&WQ  
Plant Sampling Procedure- M/O&CRAO  
Hand Compositing- M/O&CRAO  
Proper Sample Handling-CRAO&WQ  
Automatic Sampler Section- CRAO&WQ  
Field Blanks-CRAO  
Special Sampling-CRAO  
Oil and Grease- CRAO  
Inorganics- CRAO  
Collection Procedure Example- CRAO  
Cleaning Sampler Example- CRAO  
Chain of Custody Procedure Example- CRAO  
Equipment Maintenance –ETC  
Post Quiz

### **Topic 8- Laboratory Analysis/ Process Control Section**

**Topic 8 – Scope/Background:** Wastewater quality indicators are laboratory analysis methodologies to assess suitability of wastewater for disposal or re-use. Analysis selected and desired test results vary with the intended use or discharge location. Analysis measure physical, chemical, and biological characteristics of the wastewater. The program is important in preventing harm to the environment and to abide with regulations.

pH - WQ & CRAO

pH Measurements - WQ & CRAO  
pH Indicators - WQ & CRAO  
pH Calculations - WQ & CRAO  
Strong Acids –CRAO&WQ  
Alkalinity- W/Q& M/O  
Dissolved Oxygen - M/O&CRAO  
Dissolved Oxygen Procedure- M/O&CRAO  
TDS- WQ&M/O&CRAO  
TSS- WQ&M/O&CRAO  
Suspended Matter- M/O&CRAO  
Sludge Volume Indexing- M/O  
Mixed Liquor- M/O  
Fecal Coliform- M/O&CRAO  
Emerging Contaminants - WQ&CRAO  
Post Quiz

### **Topic Legend**

This CEU course covers several educational topics/functions/purposes of conventional wastewater treatment and/or activated sludge process. The topics listed below are to assist in determining which educational area is covered in a specific topic area:

**CRAO:** The regulatory and compliance component. May be a requirement of the NPDES or discharge permit, compliance, non-compliance, process control and local limits. All of the compliance and regulatory related tasks require A/S facilities to be sampled/monitored throughout the process including sampling dried sludge. This along with the EPA information is to satisfy the regulatory portion of your operator training.

**DISINFECTION:** This area covers plant or effluent disinfection procedures. O&M training for many operators.

**M/O:** The biological component. The microorganisms that are WWT/A/S specific. This is a broad definition, but applies to any wastewater operation or specific process that grows and utilizes microorganisms (recirculated RAS) to digest or eat food. This can apply to lagoons, oxidation or devices that utilize some form of A/S. Also covers wastewater microorganism identification, sampling and process control. Laboratory training for many operators.

**O&M:** This area is for normal operation and/or maintenance of the plant. O&M training for many operators.

**SAFETY:** This area is describing process safety procedures.

**TECHNICAL:** The mechanical or physical treatment process/component. The WWT or A/S process including pretreatment processes/applications/engineering/theories. Bar screens to Outfall, Fixed-film to Clarifiers. Blowers to Chemical feeders. O&M training for many operators.

**WQ:** Having to do with water quality or pollutants. May be a requirement of your NPDES or discharge permit. This along with the EPA information is to satisfy the regulatory portion of your operator training.

**ETC:** Related A/S or wastewater Information.



### 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 valid pages times 2 equals 800 divided by 60 minutes = 16.6 hours

200 questions equals 3.3 hours

100 quiz questions equals 1.6 hours

**Total time 21.5 hours**

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

### Timed Averages – Beta Testing

Students have reported the following time burden for successful completion of this distance learning course to be estimated to average of 20 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 a proctored final assignment with a score of 70% or better.

### Final Conclusion

The average time for the Activated Sludge course is 20 hours with an average score of 87 percent.

### 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 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. 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.

**Course Author  
Melissa Durbin**

This course was co-authored by Melissa Durbin; she has over 20 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 wastewater treatment 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.

**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.

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

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



**Melissa Durbin, Author and Dean of Instruction.**

30 years' experience in wastewater treatment along with 18 years of college instruction. Call me or any of the other Instructors for course assistance. I welcome your input and comments and hope you enjoy this course.

### **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 Registration and Support**

TLC offers complete registration and support services for all correspondence courses via e-mail, Web site, telephone, fax, and mail. TLC will attempt to provide immediate, prompt service.

When a student registers for a distance or 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 or not to grant the request.

Students have 90 days from receipt of this manual to complete the assignments in order to receive their continuing education units (CEUs) or professional development hours (PDHs). A score of 70% or better is necessary to pass this course. If students need any assistance, they should e-mail or call TLC with their concerns. In the interest of privacy, students' social security numbers are not used for tracking. Instead, a unique, alternate number is assigned to each student.

### **Instructions for Written Assignments**

The Activated Sludge training correspondence 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](mailto:info@tlch2o.com), but they may be faxed to (928) 468-0675.

**Prerequisites:** None

### **Required Texts**

The Activated Sludge CEU course CEU training course comes complete, no other materials are necessary.

### **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.

### **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.

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

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

### **TLC's Educational Learning Objective Topics**

The general course descriptions or topic titles may be different from the detailed description of the course's outline or learning objectives. These terms may be an alternative expression or a substitute but essentially having the same meaning. This is done for reading or for editing purposes. The detailed alpha and beta-testing data is not available in this document and is proprietary information belonging to a third party. The CEU course covers several educational topics/functions/purposes/objectives of compliance. The general course description of topics may be different from the detailed description. These differences are cosmetic only. The topics listed are to assist in determining which educational objective or goal that is covered for a specific educational topic area. The general information is available in the detailed beta-testing information and may be found in the course's table of contents. The detailed testing information is not available in this document and is proprietary information. See page 7 of this document.

### **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.

### **Security and Integrity**

We expect every student to produce his/her original, independent work. Lesson sheets and final exams are not returned to the students, to discourage sharing of answers. If any fraud or deceit is discovered, the student will forfeit all fees, and the appropriate agency will be notified.

Any student whose work indicates a violation of the Academic Misconduct Policy (cheating and/or plagiarism) can expect penalties as specified in the Student Handbook, which is available through Student Services; contact them at (928) 468-0665.

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

TLC provides a glossary 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. 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

## **Student Concerns**

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

## **Recordkeeping and Reporting Practices**

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

## **TLC Record Storage**

TLC's training records include the following elements:

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

## **Grading Criteria**

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

## **Final Assignment**

The final examination assignment is determined by the examination administrator or the 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 Scale**

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 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.

### **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.

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

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

### **At the end of the course, the student will be able to...**

Describe effective and efficient wastewater activated sludge methods (RAS and WAS) and generally accepted conventional 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 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.*

## **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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