



Level 3 Wastewater Operator Course

OMFS Training Series
2023 Syllabus Course Description
Operations Group

Revision	Date	Description	Author	Checked	Reviewed	Approved
Rev 1	02/02/2022	Update to incorporate SOP language	JF			

Level 3 Wastewater Course Syllabus

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Executive Summary

The OMFS Technical Services Group, in conjunction with the Operations Group, approved an initiative to gather historical and institutional training materials to reconstruct and reconfigure our Operations and Management (O&M) Training Program.

This program was intended to be convenient and practical for busy Operators. In addition to providing institutional materials, this program will create new formats and content flow, coupled with innovative approaches and coaching delivery. Our training program is meant to be accredited by all Regulatory Authorities.

Training course materials will be delivered in the format requested by each State. Participating States will assign CEU values or equivalent. Jacobs will utilize an internal framework to file training materials, enrolled participants, participant attendance signatures, and completed quiz/test scores. Course accountability will be documented by a course completion sign-off sheet and verified by the Training Program Administrator.

Our training program has been prioritized to be offered to our Operators as soon as possible and be incorporated into Jacobs eLearning platform. It is expected the Training Program will quickly evolve to reflect the needs of the Operations Group and Leadership.

1. Course Syllabus Description

The *Level 3 Wastewater Operator Course* is intended to be taken by the Operator with 3- 5 years of experience. They will explore data interpretation and anomalies. They will be given the opportunity to gain an in depth look at the technical methods and applications learned in Level 1 and Level 2.

This course is not intended to compete with industry recognized technical training courses (i.e., *Water Otter*, or *University of California Sacramento Ken Kerri Courses*), nor is it intended to compete with group learning tools like (*Jacobs Operator Bookshelf*).

The *Level 3 Wastewater Operator Course* is intended to provide the individual Operator with State recognized CEU valued Modules, containing advanced wastewater problem solving scenarios so that they may apply critical thinking to specific solutions relatable to the unique Projects we serve. In this course the Operator will be introduced to:

- a) Activated Sludge Process Control
- b) Biological Nutrient Removal
- c) Field Observations
- d) Chemical Calculations and Treatment
- e) Filtration Basics
- f) Trend Analysis
- g) Instrumentation and Control
- h) Importance of Control loops useful Feedback
- i) Math Review

The *Level 3 Wastewater Operator Course* consists of 15 Modules designed to take between 1 hour to 1.5 hours/Module to review and complete at the Operator's convenience. Each Module will include:

- Simple Text (designed for ease of reading and comprehension)
- Content Examples
- Content Diagrams
- Module Quiz

Each Module encourages and provides examples of technical materials that can be practiced until confidence and material is understood and retained. Course retention is critical. Technical Coaches will be provided to help Operators understand and practice/apply what they have learned.

Each Module will require the Operator to fill out a Course Completion Sign-Off sheet that includes Course title, Module title, date, printed name, certification number, and signature. The Project Manager (or designee) will be required to ensure Operators are utilizing the course material appropriately and successfully applying what they have learned in the field.

The Course content and brief description is provided in Appendix A.

2. Module Lesson Plan

The *Level 3 Wastewater Operator Course* is a self-paced series of *PowerPoint* presentations designed to allow the participant the opportunity to read course materials and then observe or experience examples of the content. The *PowerPoint* presentations will provide pop up answers to questions and provide math exercises encouraging repetitive practice. Each Course Module will have a Module ending Quiz that will be scored and tracked.

The learning environment will be in a quiet place to help the Operator focus without distractions (headphones), furnished with a desktop or laptop computer, with the downloaded Modules. The Project Manager (or designee) will be responsible for providing the Operator with a printed copy of the Course Completion Sign-In Sheet, and Module # Quiz (Printable) and other materials (calculator, scratch paper for notes and computations) and will collect the Module Quiz upon completion.

Upon completing all 15 Modules, and achieving a passing grade of 70%, the Operator will be given a 100 question Final Exam which will be proctored by the Project Manager (or designee). The Final Exam will serve to confirm Operator retention of the Modules and may be utilized as part of the Operator Performance Program internally known as e3.

3. Program Tracking and Accountability

The Training Program Administrator will score and store the Module Quizzes. Scores will be made available to the participants, as well as to Project Manager (or designee) and Regional Leadership. An assigned Coach (local Project resource or Regionally assigned Consultant) will be available to support the Operator's demonstrative understanding of the materials. This coordinated Team approach assures the Operator's needs are addressed and that Course progress is maintained. Operators will be given the course material objectives as part of their annual performance objectives.

Appendix A. Course Module Descriptions

The following Modules are offered in the recommended progression:


Module	Description	Duration
Module 1 – Activated Sludge Process Control	This Module describes process control and the need to identify key parameters	1 Hour
Module 2 – Activated Sludge Bulking & Foaming	This Module describes Sludge Bulking and Sludge Foaming and primary causes for the occurrence	1 Hour
Module 3 – BNR N Removal	This Module describes biochemical nitrification oxidation	2 Hours
Module 4 – BNR P Removal	This Modules describes PAO behaviors and process control related to those behaviors	1 Hour
Module 5 – Advanced Module Polymer	This Module describes cationic and anionic polymer use as a Settling Enhancer	.5 Hour
Module 6 – MCRT vs SRT	This Module describes the difference between MCRT versus SRT as applied to biomass inventories within aeration and clarification	1 Hour
Module 7 – Chemical Dose Calc	This Module describes feed rate, dose, chemical usage and effective applied measurement	1 Hour

Appendix A. Course Module Descriptions (Continued)

Module	Description	Duration
Module 8 – Trend Analysis	This Module describes the importance of data trending and its' interpretation	1.5 Hours
Module 9 – Chemical Treatment	This Module describes advanced primary treatment options including the use of metal salts	1 Hour
Module 10 – Filtration Basics	This Module describes filtration as a tertiary treatment process and explores various designs and operations	1.5 Hours
Module 11 – Unlucky Numbers	This Module describes how to identify Bad Data and its potential consequences	1 Hour
Module 12 – Statistical Control	This Module describes how accuracy and precision differ. This Module introduces statistical control	1 Hour
Module 13 – Flow Basics	This Module describes measurement devices used for recording and balancing flow so as to achieve optimal plant operation	1 Hour
Module 14 – Control Loops	This Module describes control loops and their use in providing needed feedback	1 Hour
Module 15 – Math Review	This Module applies wastewater process math in practice scenarios	1.5 Hours
Final Exam	100 question final exam	3 Hours
Total		20 Hours

Appendix B. Course Completion Sign-Off Sheet

Upon completion of each Module, and achieving a passing grade of 70%, the Operator will obtain a signature from the Project Manager acknowledging module completion. Then access to the next Module will be provided. The Project Manager (or designee) is responsible for Attendee enrollment. The Attendee must commit to full participation, and application of acquired knowledge towards individual professional growth. Upon completion of all modules, the Operator will legibly print their name and provide a valid signature, State Operator License number and date to receive credit. The Training Program Administrator will file the Course Completion Sign-Off Sheet and Module Quiz answer sheets then issue the Certificate of Completion.

		Course Completion Sign-Off Sheet State: __ Course # _____ Operator Name _____		
Module	Start Date	Completion Date	Hours to Complete	Supervisor Signature
Module 1 – Activated Sludge Process Control				
Module 2 – Activated Sludge Bulking & Foaming				
Module 3 – BNR N Removal				
Module 4 – BNR P Removal				
Module 5 – Advanced Module Polymer				
Module 6 – MCRT vs SRT				
Module 7 – Chemical Dose Calcs				
Module 8 – Trend Analysis				
Module 9 – Chemical Treatment				
Module 10 – Filtration Basics				
Module 11 – Unlucky Numbers				
Module 12 - Statistical Control				
Module 13 – Flow Basics				
Module 14 – Control Loops				
Module 15 - Math Review				
I understand that it is encumbant upon me to complete all modules in this Course and that Jacobs verifies and audits the completion of training by employees. My signature indicates that I personally reviewed and completed all portions of this Course and no one has completed any portion of this course on my behalf.				
_____ Operator Signature		_____ DD/MM/20YY Date		_____ # Operator License #

Appendix C. Wastewater Certificate of Completion

Upon completion of the Course, the Training Program Administrator will fill in the Certificate of Completion and provide a copy to the Operator for their records. The Operator is responsible for submitting this Certificate to the State. The Training Program Administrator can assist, if needed. When required, this form will be customized to include State specific information.



The image shows a certificate form for Jacobs. On the left side, there is a large, stylized graphic consisting of several overlapping diagonal bands in shades of blue and grey. The text on the right side of the form is as follows:

Jacobs
CERTIFICATE OF COMPLETION
First Last Name
has successfully completed:
Level 3 – Wastewater Operator Course
Awarded _____ CEU
Course ID # _____
Operator Certification # _____
On _____ (Date)
As reviewed and approved by:

John Dunty, Course Advisor