



Level 1 Wastewater Operator Course

OMFS Training Series
Syllabus Course Description
Document No. | 0100

July 1, 2021

Operations Group

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved

Distribution of copies

Revision	Issue approve	Date issued	Issued to	Comments

Syllabus Description

Level 1 Wastewater Operator Course

Project No:	Project Number
Document Title:	Syllabus Description
Document No.:	Document No. 0100
Revision:	
Document Status:	
Date:	July 1, 2021
Client Name:	Operations Group
Client No:	
Author:	John Dunty
File Name:	

© Copyright 2021 Please select a legal entity from the Change Document Details option on the Jacobs ribbon. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Contents

Executive Summary
1. Syllabus Description	Error! Bookmark not defined.
2. Module Lesson Plan.....	3
3. Program Tracking and Accountability.....	4

Appendix A. Course Descriptions

Appendix B. Individual Training Sign – In Sheet

Appendix C. Team Training Sign - In Sheet

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 mandated to be convenient and practical for busy Projects and Operators. In addition to providing institutional materials, this Program will create new formats and content flow, coupled with innovative approaches and coaching delivery.

Program accountability will provide training program participant tracking, signature attendance and quiz/test scores.

Our Training Program is mandated to be accredited by all Regulatory Authorities within the States Jacobs operates. The ABC accreditation program has been retired. As a result, specific accreditation requirements are defined State-by-State. Training course materials will be delivered in the format requested by each State. Participating States will assign CEU value. Jacobs will utilize our e3 framework to file training materials, enrolled participants, participant attendance signatures and completed quiz/test scores.

Our training program has been prioritized to “go live” ASAP and be incorporated into Jacobs eLearning. 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 1 Wastewater Operator Course* was developed with the inexperienced Operator in mind. 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 1 Wastewater Operator Course* is instead intended to provide the individual Operator with State recognized CEU valued Modules, containing foundational wastewater information and practices that are applied and relatable to the unique Projects we serve, with active, visual examples. In this course the Operator will be introduced to:

- a) Basic Wastewater Characteristics
- b) Foundational Wastewater Treatment Schemes
- c) Effectively Address Treatment Challenges
- d) Basic Asset Management Responsibilities
- e) Proven Operator Industry Standard Field Practices
- f) Industry Standard Record Keeping and Reporting Practices
- g) Effective Habits for Training Material Field Application and Retention
- h) Compliment and Support other Jacobs Training Programs

The *Level 1 Wastewater Operator Course* consists of 24 Modules designed to take approximately 30 minutes 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 and Videos
- Module Quiz

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

The Operator Bookshelf (containing electronic flipbooks) is a companion of this Course and can be taken by the Project Team as an entry to this *New Operator Orientation Course*.

Each Module will require the Operator to fill out an attendance sheet that includes Course title, Module title, date, printed name, 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 the Appendix.

2. Module Lesson Plan

The *Level 1 Wastewater Operator Course* is a self-paced series of *PowerPoint* presentations designed to allow the participant 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 area, furnished with a desktop, or laptop computer loaded with the assigned Module files. The Project Manager will be responsible for providing the Operator with a computer, assigned Modules, Sign-In Sheet, and other materials (calculator, scratch paper for notes and computations) and will collect the quiz after completion.

Upon completing all 24 Modules, the Operator will be given a Project Leadership proctored 100 question Final Exam. The Final Exam will serve to confirm Operator retention of the Modules and may be utilized as part of the Operator Performance Program known as e3.

3. Program Tracking and Accountability

The Training Administrator, or corporate software framework will score and store the Module Quizzes. Scores will be made available to the participant, as well as to Project Manager and Regional Leadership. A qualified subject matter Coach will be assigned to those participants showing a need for specific Course help, which can be defined within the tracked Quiz scores, or Final Exam score. 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 – Introduction to Wastewater	This Module describes Operators duties and responsibilities and potential impact to the community and environment. It also introduces Biochemical Oxygen Demand (BOD) BOD calculations and applied pounds loading math.	0.5 Hours
Module 2 – Preliminary Treatment	This Module describes Preliminary Treatment processes including Headworks infrastructure, flow monitoring, screening, and grit removal. Module math covers volumetric cubic feet and headworks residual forward planning.	0.5 Hours
Module 3 – Primary Clarification	This Module describes Primary Treatment processes including volume math for a rectangular and circular clarifier.	0.5 Hours
Module 4 – Activated Sludge (Part 1)	This first of a 2 Part Activated Sludge Series describes activated sludge biology and utilizes pounds math to calculate Food to Mass ratio.	1.0 Hours
Module 5 – Activated Sludge (Part 2)	This second of 2 Part Activated Sludge Series describes process challenges associated with bulking filamentous bacteria and foam generating bacteria. Math practice is provided including Volume, Pounds, F:M, Detention and Efficiency of Removal.	1.0 Hours
Module 6 – Biomass Community Control	This Module describes Sludge Age expressed as Sludge Retention Time (SRT) and Mean Cell Residence Time (MCRT) with applied examples targeting ideal microorganism community control.	0.5 Hours
Module 7 – Process Control	This Module describes proactive process control utilizing process monitoring tools, structured weekly process control meetings and O&M coordination.	0.5 Hours

Syllabus Description

Module	Description	Duration
Module 8 – Return Activated Sludge Strategy	This Module describes Return Activated Sludge (RAS) strategies based on normal and high flow scenarios emphasizing Secondary Clarifier Detention as the key long- term performance indicator.	0.5 Hours
Module 9 – Activated Sludge Design Overview	This Module describes all of the major activated sludge design schemes including extended aeration designs, oxidation ditches, sequential batch reactors, fixed film media applications and advantages/disadvantages of each.	1.0 Hours
Module 10 – Biological Nutrient Removal	This Module describes biological nitrogen and phosphorus removal concepts and process strategies. This Module also provides alkalinity dosage math.	0.5 Hours
Module 11 – Tertiary Treatment	This Module describes Tertiary Treatment schemes including Sand and Disk Filtration, as well as chemical treatment applications.	0.5 Hours
Module 12 - Disinfection	This Module describes disinfection including chlorine- based oxidation, ozone oxidation and ultra-violet sterilization. Dechlorination is also described including chlorine demand math.	0.5 Hours
Module 13 – Aerobic Digestion	This Module describes Aerobic Digestion, Operator controls and Sludge Retention Time (SRT) math.	0.5 Hours
Module 14 – Digester Short School	This 4 Hour Module presentation describes Anaerobic Digestion biochemistry and Operator controls.	2.0 Hours
Module 15 – Selecting Process Parameters	This Module describes how to select non-permit defined sampling and process monitoring.	0.5 Hours
Module 16 - Dewatering	This Module describes the common methods of biosolids dewatering including Vacuum Filters, Plate & Frame Presses, Centrifuges, Belt Filter Press, Screw Press and Fan Press.	0.5 Hours
Module 17 – Belt Filter Press Operation	This Module focuses on Belt Filter Press (BFP) Operation and care.	0.5 Hours
Module 18 – Proactive Predictive Maintenance	This Module describes proactive asset care reflecting the needs of new and older assets.	0.5 Hours
Module 19 - Troubleshooting	This Module describes tools and the logical progression of effective troubleshooting.	0.5 Hours
Module 20 – Logbook Entry & Status Exchange	This Module describes industry standard methods for Operator logbook entry to capture and preserve facility event and process history.	0.5 Hours

Syllabus Description

Module	Description	Duration
Module 21 - Pumps	This Module describes centrifugal and positive displacement pumps and their applications. Pump horsepower math is included.	0.5 Hours
Module 22 – Package Plants	This Module describes the purpose and application of package plants including specific needs.	0.5 Hours
Module 23 - Housekeeping	This Module describes the Operators obligations to maintain a safe and clean work environment for the wellbeing of the team and community.	0.5 Hours
Module 24 – Operator Rounds	This Module describes the Operator field observations and duties required for field and process accountability.	0.5 Hours
Level 1 Final Exam	100 Questions	3.0 Hours
Total Hours	All Hours Listed are Estimates	18.0 Hours

Appendix B. Individual Training Sign – In Sheet

Upon completion of each Module, the Operator must legibly print their name and provide a valid signature and date to receive credit. The Project Manager is responsible for Attendee enrollment. The Attendee must commit to full participation, and application of acquired knowledge towards individual professional growth. The Program Administrator will file the signature sheets.

Jacobs Learning & Talent Management		Course Attendance Roster	
Project:		Project Manager:	Instructor:
Level 1 Wastewater Operator Course			
Module	Employee Name (print)	Employee Signature	Date Completed
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			