

2012 – 2013

**Florida Department of Education
Curriculum Framework**

Program Title: Environmental Water Reclamation Technology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food & Natural Resources

Secondary – Career Preparatory	
Program Number	8007200
CIP Number	0703010400
Grade Level	9-12
Standard Length	3 credits
Teacher Certification	ENV WAT TECH 7G
CTSO	
SOC Codes (all applicable)	51-8031
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food & Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food & Natural Resources career cluster.

The content includes but is not limited to applications of water resource management, application of safety procedures, record keeping and sampling, wetland management, reclamation treatment techniques, solid waste disposal, storm water management, hazardous material storage, government water technology regulations, filtrations, sedimentation, fluoridation process, and perform maintenance and inspections on equipment..

Program Structure

This program is a planned sequence of instruction consisting of three courses and one occupational completion point

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8007110	Introduction to Environmental Water Technology	1 credit	51-8031	2
	8007120	Intermediate Environmental Water Technology	1 credit		2
	8007210	Advanced Environmental Water Reclamation Technology	1 credit		2

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Academic Alignment

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards contained in specific math and science core academic courses. This alignment resulted from a collaborative review by Career and Technical Education (CTE) teachers and core academic teachers. The table below contains the results of the alignment efforts. Data shown in the table includes the number of academic standards in the CTE course, the total number of math and science standards contained in the academic course, and the percentage of alignment to the CTE course. The following academic courses were included in the alignment (see code for use in table).

Academic Subject Area	Academic Course
Math	Algebra 1 (ALG1) Algebra 2 (ALG2) Geometry (GEO)
Science	Anatomy/Physiology Honors (APH) Astronomy Solar/Galactic Honors (ASGH) Biology 1 (BIO1) Chemistry 1 (CHM1) Earth-Space Science (ESS) Genetics (GEN) Marine Science 1 Honors (MS1H) Physical Science (PS) Physics 1 (PHY1)

Course	Math			Science								
	ALG1	ALG2	GEO	APH	ASGH	BIO1	CHM1	ESS	GEN	MS1H	PS	PHY1
Introduction to Environmental Water Technology	6/36 17%	2/41 5%	2/45 4%	9/53 17%	13/52 25%	22/56 39%	25/55 46%	21/58 36%	13/35 37%	26/42 62%	26/56 46%	16/53 30%
Intermediate Environmental Water Technology	13/36 36%	3/41 7%	2/45 4%	3/53 6%	12/52 23%	13/56 23%	27/55 49%	15/58 29%	3/35 9%	28/42 66%	23/56 41%	18/53 34%
Advanced Environmental Water Reclamation Technology	**	**	**	**	**	**	**	**	**	**	**	**

** Alignment pending

Alignment attempted, but no correlation to academic course.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Essential Skills

Essential skills identified by the Division of Career and Adult Education have been integrated into the standards and benchmarks of this program. These skills represent the general knowledge and skills considered by industry to be essential for success in careers across all career clusters. Students preparing for a career served by this program at any level should be able to demonstrate these skills in the context of this program. A complete list of Essential Skills and links to instructional resources in support of these Essential Skills are published on the CTE Essential Skills page of the FL-DOE website (http://www.fldoe.org/workforce/dwdframe/essential_skills.asp).

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's IEP or 504 plan or postsecondary student's accommodations plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their postsecondary service provider. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (ESE) will need modifications to meet their special needs. Modifications change the outcomes or what the

student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note postsecondary curriculum cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number (for eligible students with disabilities).

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation. A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Identify the historical, social, cultural and potential applications of water resource management.
- 02.0 Describe and discuss hydrology.
- 03.0 Practice safety skills and procedures.
- 04.0 Demonstrate record keeping and sampling procedures.
- 05.0 Describe and discuss geologic principles of water resources.
- 06.0 Manage wetlands.
- 07.0 Identify career opportunities and organizational dynamics.
- 08.0 Apply scientific and technological principles.
- 09.0 Describe water treatment techniques.
- 10.0 Collect and dispose of solid waste.
- 11.0 Explain water treatment techniques.
- 12.0 Discuss and manage stormwater systems.

- 13.0 Describe water distribution.
- 14.0 Demonstrate the management and environmentally sound use of water resources.
- 15.0 Maintain water treatment equipment and facilities.
- 16.0 Demonstrate language arts knowledge and skills.
- 17.0 Demonstrate mathematics knowledge and skills.
- 18.0 Demonstrate science knowledge and skills.
- 19.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas.
- 20.0 Solve problems using critical thinking skills, creativity and innovation.
- 21.0 Discuss related standards and regulations.
- 22.0 Conduct site assessment.
- 23.0 Practice safety skills and procedures.
- 24.0 Manage data and physical resources.
- 25.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
- 26.0 Control incidents.
- 27.0 Prepare a plan.
- 28.0 Perform remediation.
- 29.0 Collect and dispose of solid waste.
- 30.0 Identify continuing education needs and opportunities.
- 31.0 Conduct recordkeeping and sampling procedures.
- 32.0 Review stormwater permit procedures.
- 33.0 Demonstrate the use of industry appropriate tools, equipment, and instruments
- 34.0 Demonstrate industry specific mathematical calculations.
- 35.0 Demonstrate industry specific science skills and techniques.
- 36.0 Identify career opportunities and organizational dynamics in water resources.
- 37.0 Demonstrate water treatment techniques.
- 38.0 Discuss an Industrial Pretreatment Program/Inspection.
- 39.0 Discuss comprehensive quality assurance plan.
- 40.0 Use information technology tools.
- 41.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
- 42.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 43.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
- 44.0 Describe the importance of professional ethics and legal responsibilities
- 45.0 Explain the importance of employability skill and entrepreneurship skills.
- 46.0 Demonstrate personal money-management concepts, procedures, and strategies.
- 47.0 Identify professions related to the water technology field.
- 48.0 Identify scientific concepts common in water and wastewater treatment.
- 49.0 Identify safety hazards associated with water technologies.
- 50.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 51.0 Solve basic math problems common to water technologies.
- 52.0 Define pumping and basic hydraulic principles.
- 53.0 Define principles of disinfection.
- 54.0 Define sampling techniques.
- 55.0 Define federal, state, and local regulations that apply to water technologies.
- 56.0 Demonstrate employability skills.
- 57.0 Identify the basic characteristics and principles of wastewater treatment.

- 58.0 Identify sampling techniques and interpret the results.
- 59.0 Describe the sources of wastewater and the types of collection systems.
- 60.0 Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management.
- 61.0 Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management.
- 62.0 Perform equipment inspection, and identify basic maintenance for the treatment train, effluent disposal, and solids management.
- 63.0 Identify and correct facility operational problems.
- 64.0 Identify appropriate federal, state, and local regulations.
- 65.0 Describe federal, state, and local laws for the handling, storage, and use of toxic and hazardous materials.

2012 – 2013

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Environmental Water Technology
Course Number: 8007110
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of hydrology, safety skills and procedures, geological principles of water resources, management of wetlands, storm water systems, environmental water resources, equipment and facility maintenance, scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Math		Science					
Algebra 1	6/36 17%	Biology 1	22/56 39%	Anatomy/Physiology Honors	9/53 17%	Astronomy Solar/Galactic Honors	13/52 25%
Algebra 2	2/41 5%	Chemistry 1	25/55 46%	Genetics	13/35 37%	Marine Science 1 Honors	26/42 62%
Geometry	2/45 4%	Physics 1	16/53 30%	Earth-Space Science	21/58 36%	Physical Science	26/56 46%

** Alignment pending

Alignment attempted, but no correlation to academic course.

01.0 Identify the historical, social, cultural and potential applications of water resource management--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
 SC.912.E.7.8; HE.912.C.1.3; SC.912.L.15.8, 13; SC.912.L.16.4, 7, 8, 9, 10,
 SC.912.L.17.1, 8, 11, 16, 19, 20; SC.912.L.18.12; SC.912.N.1.1

- 01.01 Explain the developmental progression of water resource management.
- 01.02 Research emerging problems and issues with water resource management.
- 01.03 Explain the global importance of water conservation.
- 01.04 Explain international issues affecting water resources and water quality.
- 01.05 Compare practices that either enhance or hinder water quality.
- 01.06 Differentiate between point and non-point sources of pollution.
- 01.07 Identify diseases and illnesses associated with water borne pathogens.
- 01.08 Explain methods to control and eradicate diseases and illnesses associated with water borne pathogens.
- 01.09 Explain the significance genetic factors, environmental factors and pathogenic agents to health from the perspective of both individual and public health.
- 01.10 Analyze how population size is affected by water quantity and quality.

- 01.11 Evaluate the cost and benefits of renewable and nonrenewable resources such as water, energy, fossil fuels, flora and fauna.
- 01.12 Predict the impact of individuals on water quality and quantity and how human lifestyles affect sustainability.
- 01.13 Discuss the special properties of water that contribute to earth's suitability as an environment for life.

02.0 Describe and discuss hydrology--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.E.5.2, 4; SC.912.E.6.2, 3, 4, 5; SC.912.E.7.1, 3; SC.912.L.17.16; SC.912.P.8.1, 5, 7

- 02.01 Define basic hydrological terms.
- 02.02 Explain surface water systems.
- 02.03 Explain ground water systems.
- 02.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.05 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.06 Identify alternative sources of water.
- 02.07 Identify soil conditions as they relate to water quality.
- 02.08 Research and explain saltwater intrusion.
- 02.09 Identify and discuss water wells and water reservoirs.

03.0 Practice safety skills and procedures--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.P.8.5, 7, 11

- 03.01 Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment.
- 03.02 Identify and utilize safe work practices.
- 03.03 Identify physical, chemical, biological, and zoological hazards.
- 03.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Agency (OSHA), and Hazard Communication (HAZCOM) regulations.
- 03.05 Determine, review, and follow regulations.
- 03.06 Develop and maintain appropriate safety records.
- 03.07 Identify and describe "on the job" hazards and risks including fire/explosive, lead asbestos, weather hazards and emergency response preparedness
- 03.08 Perform lifting activities safely.
- 03.09 Identify ladder safety and fall protection.
- 03.10 Become certified in first aid/CPR and describe First Responder responsibilities.

04.0 Demonstrate record keeping and sampling procedures--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.N.1.1, 4, 6; SC.912.P.8.8, 11;

- 04.01 Define sampling objectives, protocol and Chain of Custody.
- 04.02 Operate, calibrate, and maintain sampling equipment.
- 04.03 Develop sampling strategy.
- 04.04 Perform applicable field measurements including pH, dissolved oxygen, temperature, chlorine residual, and turbidity.
- 04.05 Appropriately preserve, document, and dispose of samples.
- 04.06 Identify cross-contamination and other risks associated with sampling.
- 04.07 Describe, plan, and utilize quality assurance practices.
- 04.08 Submit samples for analysis.
- 04.09 Perform periodic follow-up sampling.
- 04.10 Identify permit requirements and procedures.
- 04.11 Define and follow federal, state and local sampling guidelines.

05.0 Describe and discuss geologic principles of water resources--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
MA.912.F.3.15; SC.912.E.6.1, 2, 4; SC.912.L.17.13; SC.912.P.8.6, 7, 8, 11

- 05.01 Explain the geological history of Florida.
- 05.02 Create a soil profile and describe the associated components.
- 05.03 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 05.04 Interpret legal descriptions of land.
- 05.05 Identify mapping and surveying techniques and equipment.
- 05.06 Analyze local mineral resources.
- 05.07 Describe lithological descriptions of local units/formations.
- 05.08 Describe Florida aquifer system.
- 05.09 Discuss basic groundwater chemistry.
- 05.10 Describe local geology related problems.

06.0 Manage wetlands--student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.E.5.4; SC.912.L.14.35; SC.912.L.17.4, 8, 16, 19, 20;

- 06.01 Identify ecosystems.
- 06.02 Discuss the structure and function of wetlands.
- 06.03 Define limits of wetlands.
- 06.04 Discuss habitat value.
- 06.05 Identify fauna and flora.
- 06.06 Determine desirable vs. nuisance plant and animal species.
- 06.07 Describe changes in ecosystems resulting from seasonal variations, climate change, environmental impacts, and succession.
- 06.08 Explain the general distribution of life in aquatic systems as a function of effluent discharge, stormwater runoff and drought.

07.0 Identify career opportunities and organizational dynamics--The student will be able to:

- 07.01 Describe the nature and origin of career opportunities in water, water reclamation and environmental industries.
- 07.02 Compare supervisory and administrative responsibilities.

- 07.03 Identify organizational structures.
- 07.04 Identify team building communication skills.
- 07.05 Identify problem-solving techniques.
- 07.06 Identify employee responsibility/benefits.
- 07.07 Identify legal aspects of personnel relations.
- 07.08 Communicate effectively in verbal, written, and nonverbal modes.
- 07.09 Recognize and demonstrate good listening skills.
- 07.10 Conduct small informal and formal group meetings.
- 07.11 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 07.12 Recognize and demonstrate effective communications skills in the workplace.
- 07.13 Identify related associated professional associations.
- 07.14 List and describe the careers associated with water treatment, distribution, and management.
- 07.15 Determine the educational requirements and experience needed to enter and advance in water, water reclamation and environmental occupations.

08.0 Apply scientific and technological principles--The student will be able to:

- 08.01 Employ scientific measurement skills.
- 08.02 Demonstrate safe and effective use of common laboratory equipment.
- 08.03 Implement the scientific method and science process skills through the design and completion of a research project.
- 08.04 Interpret, analyze, and report data.
- 08.05 Evaluate advances in biotechnology and its impact on water resources.
- 08.06 Compare and contrast structure and function of various types of microscopes.

09.0 Describe reclaimed water treatment techniques--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:

SC.912.L.17.16, 19, 20; SC.912.L.18.6, 8;

- 09.01 Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater.
- 09.02 Describe disposal options.
- 09.03 Identify septic tanks types and functions.
- 09.04 Apply principles of nutrients, water and waste management to environmental problems.

10.0 Collect and dispose of solid waste--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:

SC.912.17.16, 19, 20

- 10.01 Describe history of solid waste disposal.
- 10.02 Identify types of waste.
- 10.03 Identify household hazardous waste collection and disposal programs.
- 10.04 Research and evaluate solid waste disposal options. (landfill, incineration, and composting, etc.)

11.0 Explain water treatment techniques--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.E.6.5; SC.912.L.17.16, 19, 20; SC.912.L.18.6, 8; SC.912.P.8.2;

- 11.01 Describe drinking water treatments.
- 11.02 Identify and describe the desirable water qualities.
- 11.03 Explain how changes in water quality affect life cycles.
- 11.04 Explain, monitor, and maintain freshwater/salt water quality standards.
- 11.05 Calculate volume in circular, rectangular and irregular shaped water structures.
- 11.06 List and explain sources of pollution and methods of preventing and/or correcting these pollution problems.

12.0 Discuss and manage stormwater systems--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.E.6.2; SC.912.L.17.16, 19, 20;

- 12.01 Determine boundaries of watersheds.
- 12.02 Identify runoff coefficients.
- 12.03 Identify the relationship between construction sites and stormwater systems.
- 12.04 Research rules and regulations in regards to stormwater systems.
- 12.05 Contact local municipalities to determine stormwater regulations.
- 12.06 Research current construction trends and methods of stormwater systems.
- 12.07 Define topography and its effects on stormwater.
- 12.08 Discuss the affects that uncollected stormwater has on lakes, rivers, ponds and wetlands.

13.0 Describe water distribution--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.P.12.11

- 13.01 Identify the need for backflow prevention and cross connections controls.
- 13.02 Identify necessary equipment for water distribution purposes e.g.; pumps, motors, valves, storage tanks, pipes and fittings.
- 13.03 Read and maintain meters.
- 13.04 Identify maintenance requirements for fire hydrants, pipes, and valves.
- 13.05 Identify proper procedures for operation and maintenance of lift stations.
- 13.06 Discuss importance of period flushing of water distribution systems.

14.0 Demonstrate the management and environmentally sound use of water resources--The student will be able to:

- 14.01 Determine quality of groundwater and surface water.
- 14.02 Identify solids and dissolved solids found in water.
- 14.03 Identify primary and secondary contaminants.
- 14.04 Identify unregulated organic compounds.

15.0 Maintain water treatment equipment and facilities--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1; SC.912.P.10.4, 5, 7;

- 15.01 Research water treatment equipment and facility components.
- 15.02 Identify appropriate temperatures and other external conditions.
- 15.03 Identify the effect of weather conditions and changes.
- 15.04 Describe appropriate flow rates and tank levels.
- 15.05 Create a checklist and/or policies of necessary procedures to handle daily conditions, hazards and/or malfunctions.
- 15.06 Describe maintenance procedures and techniques of filters, pipes, generators, meters, motors, valves, instruments, injectors, storage basins etc.

16.0 Demonstrate language arts knowledge and skills--The students will be able to: AF2.0

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1; SC.912.N.3.5

- 16.01 Locate, comprehend and evaluate key elements of oral and written information.
AF2.4
- 16.02 Draft, revise, and edit written documents using correct grammar, punctuation and vocabulary. AF2.5
- 16.03 Present information formally and informally for specific purposes and audiences.
AF2.9

17.0 Demonstrate mathematics knowledge and skills--The students will be able to: AF3.0

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.3.5; MA.912.A.1.4, 5; MA.912.A.2.2, 6, 7, 13; MA.912.A.3.2, 3;
MA.912.A.10.1, 2; MA.912.D.4.1; MA.912.G.8.2; MA.912.G.8.3; MA.912.S.1.2;
MA.912.S.3.2, 3;

- 17.01 Demonstrate knowledge of arithmetic operations. AF3.2
- 17.02 Analyze and apply data and measurements to solve problems and interpret documents. AF3.4
- 17.03 Construct charts/tables/graphs using functions and data. AF3.5

18.0 Demonstrate science knowledge and skills--The students will be able to: AF4.0

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1, 2, 3, 4, 4, 6, 7; MA.912.A.2.1; MA.912.A.3.1; MA.912.A.10.1, 2;
MA.912.S.1.1, 2; MA.912.S.2.1; MA.912.S.3.2, 3;

- 18.01 Discuss the role of creativity in constructing scientific questions, methods and explanations. AF4.1
- 18.02 Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings.
AF4.3

19.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1; MA.912.G8.2, 3; MA.912.A.2.1, 2; MA.912.A.10.1;

- 19.01 Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace. CM1.0
- 19.02 Locate, organize and reference written information from various sources. CM3.0
- 19.03 Design, develop and deliver formal and informal presentations using appropriate media to engage and inform diverse audiences. CM5.0
- 19.04 Interpret verbal and nonverbal cues/behaviors that enhance communication. CM6.0
- 19.05 Apply active listening skills to obtain and clarify information. CM7.0
- 19.06 Develop and interpret tables and charts to support written and oral communications. CM8.0
- 19.07 Exhibit public relations skills that aid in achieving customer satisfaction. CM10.0

20.0 Solve problems using critical thinking skills, creativity and innovation--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
MA.912.A.10.1, 2; SC.912.N.1.1, 4, 5, 6, 7; SC.912.N.2.1, 2, 4, 5; SC.912.N.3.5;
SC.912.N.4.1; MA.912.A.2.2, 13; MA.912.A.10.1; MA.912.S.2.1; MA.912.S.3.1;

- 20.01 Employ critical thinking skills independently and in teams to solve problems and make decisions. PS1.0
- 20.02 Employ critical thinking and interpersonal skills to resolve conflicts. PS2.0
- 20.03 Identify and document workplace performance goals and monitor progress toward those goals. PS3.0
- 20.04 Conduct technical research to gather information necessary for decision-making. PS4.0

2012 - 2013

**Florida Department of Education
Student Performance Standards**

Course Title: Intermediate Environmental Water Technology
Course Number: 8007120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of standards and regulations, site assessments, safety, managing data and physical resources, prepare a plan, perform remediation, collect and dispose of solid waste, record keeping and sampling procedures, career opportunities, leadership, teamwork, and money management concepts. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Math		Science					
Algebra 1	13/36 36%	Biology 1	13/56 23%	Anatomy/Physiology Honors	3/53 6%	Astronomy Solar/Galactic Honors	12/52 23%
Algebra 2	3/41 7%	Chemistry 1	27/55 49%	Genetics	3/35 9%	Marine Science 1 Honors	28/42 66%
Geometry	2/45 4%	Physics 1	18/53 34%	Earth-Space Science	15/58 29%	Physical Science	23/56 41%

21.0 Discuss related standards and regulations--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
 SC.912.N.1, 2, 3, 4

- 21.01 Explain the importance and impacts of local, state, and federal regulations and required documentation.
- 21.02 Describe the Florida Administrative Code's (F.A.C.) impact on environmental issues.
- 21.03 Discuss the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA).
- 21.04 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statutes.
- 21.05 Research how rules and laws are made and mandated.
- 21.06 Describe permitting procedures.
- 21.07 Identify regulation resources.
- 21.08 Describe various licensing procedures.
- 21.09 Research governmental regulation authorities associated with Florida's water sources.
- 21.10 Describe National Pollution Discharge Elimination System (NPDES).
- 21.11 Identify appropriate agencies and their functions
- 21.12 Describe the role of environmental protection.

- 21.13 Create, evaluate and present a well-head protection plan.
- 21.14 Discuss the need for adequate monitoring of environmental parameters when making policy decisions.

22.0 Conduct site assessment--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.L.17.20; SC.912.N.1.1;

- 22.01 Identify the purposes of site assessment.
- 22.02 Describe required documentation.
- 22.03 Interpret blueprints
- 22.04 Demonstrate map reading
- 22.05 Obtain physical and performance measurements.
- 22.06 Assess needed equipment and processes.

23.0 Practice safety skills and procedures--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.4.2

- 23.01 Identify safety procedures for: wells, pumps, electrical equipment, motor vehicles, buildings, and other necessary equipment.
- 23.02 Handle compressed gasses, solids, and liquids safely.
- 23.03 Summarize "Right of Access" law.
- 23.04 Summarize "Confined Space" regulations.
- 23.05 Identify Zero Tolerance policies.
- 23.06 Identify employee limitations.
- 23.07 Identify appropriate decontamination procedures.
- 23.08 Identify principles of toxicology.
- 23.09 Identify routes of exposure.
- 23.10 Identify respirator safety procedures.
- 23.11 Discuss history of hazardous materials and hazardous categories.
- 23.12 Discuss common chemical compatibility.
- 23.13 Describe and discuss OSHA concepts.
- 23.14 Describe and discuss the Vulnerability Assessment process.

24.0 Manage data and physical resources--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1, 2, 3, 4, 5, 6, 7

- 24.01 Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and security.
- 24.02 Identify possible funding sources.
- 24.03 Prepare budgets and purchase orders.
- 24.04 Prepare a time management plan.
- 24.05 Utilize information databases.
- 24.06 Locate and interpret printed reference materials.
- 24.07 Describe network opportunities.
- 24.08 Maintain necessary/required record keeping practices and procedures.

- 24.09 Keep inventory, time sheets, and equipment maintenance logs.
- 24.10 Identify suppliers and technical resources.

25.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1

- 25.01 Define GIS and its function.
- 25.02 Use GIS software.
- 25.03 Learn GIS applications.
- 25.04 Develop a GIS model.
- 25.05 Define GPS and its function.
- 25.06 Collect GPS data and load on GIS.
- 25.07 Research and identify other remote sensing tools.
- 25.08 Identify and plot points on a map.

26.0 Control incidents--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
MA.912.G.1.4; MA.912.A.3.11; SC.912.N.1.1

- 26.01 Identify and describe reasons for controlling incidents.
- 26.02 Describe levels of response.
- 26.03 Determine and use proper chain of command.
- 26.04 Determine methods of control.
- 26.05 Demonstrate site access restriction methods.
- 26.06 Identify appropriate authorities to be notified.
- 26.07 Place equipment appropriately.
- 26.08 Orient zones.
- 26.09 Identify possible geographic hazards.
- 26.10 Identify media protocol and procedures for communicating with the public.
- 26.11 Prepare a press release for a mock incident.
- 26.12 Identify abnormal event management processes utilizing the National Information Management System (NIMS).

27.0 Prepare a plan--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1

- 27.01 Describe the need for and the types of pre-planning.
- 27.02 Identify and select necessary agency involvement.
- 27.03 Identify possible contamination zones.
- 27.04 Review contingency plans
- 27.05 Create contingency plans for hurricanes, tornadoes, floods, fires, and/or nuclear accidents (emergency response plan).
- 27.06 Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act (EPCRA) regulations.
- 27.07 Create plan for deployment.

27.08 Conduct mock disaster activities.

28.0 Perform remediation--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.L.17.16

- 28.01 Research appropriate cleaning methods.
- 28.02 Create a plan for a disaster clean up including needed materials and equipment.
- 28.03 Understand entry and closure methods.
- 28.04 Identify contamination removal procedures.
- 28.05 Design a site/system cleanliness verification procedure.
- 28.06 Identify tear down and demobilization procedures.

29.0 Collect and dispose of solid waste--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
MA.912.S.3.2; SC.912.L.17.20

- 29.01 Describe history of solid waste disposal.
- 29.02 Identify types of waste.
- 29.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.)

30.0 Identify continuing education needs and opportunities--The student will be able to:

- 30.01 Determine continuing education needs/goals.
- 30.02 Identify available educational and financial resources.
- 30.03 Identify appropriate professional associations and attend meetings where applicable.
- 30.04 Read and review trade journals.

31.0 Conduct recordkeeping and sampling procedures--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1, 2

- 31.01 Demonstrate sampling, testing and recordkeeping.
- 31.02 Collect and analyze water samples: grab, composite and representative.
- 31.03 Record data into identified database program.
- 31.04 Interpret lab results.
- 31.05 Evaluate data.
- 31.06 Measure well volumes.
- 31.07 Describe organism sampling techniques.

32.0 Review stormwater permit procedures--The student will be able to:

- 32.01 Research and demonstrate Best Management Practices (BMP), Standard Operating Procedures (SOP) and Preventive Maintains (PM).
- 32.02 Describe proper ditch, pond, culvert, and manhole inspection techniques.
- 32.03 Evaluate a storm cleanup and prevention plan.

- 32.04 Discuss pollutants, illegal dumping and discharge and demonstrate appropriate handling procedures.
- 32.05 Describe the importance of outfall structures, inlets, and treatment systems.
- 32.06 Describe the procedures to clean and televise pipes.
- 32.07 Describe the importance of ditch banks and right of ways.
- 32.08 Maintain, repair and replace pipe sections.

33.0 Demonstrate the use of industry appropriate tools, equipment, and instruments--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.P.10.2, 3, 10

- 33.01 Select and demonstrate proper use of industry appropriate tools, equipment, and instruments.
- 33.02 Demonstrate various physical science principles as applied in selected mechanical applications (e.g. levers, pulleys, hydraulics, and internal combustion).
- 33.03 Service and maintain industry appropriate equipment, instruments, facilities, and supplies.

34.0 Demonstrate industry specific mathematical calculations--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
MA.912.A.2.13; MA.912.A.3.1, 2; MA.912.A.5.1, 4; MA.912.A.10.1; MA.912.G.7.5, 7;
SC.912.E.5.6; SC.912.N.1.1; SC.912.P.8.9; SC.912.P.10.5; SC.912.P.12.2, 3

- 34.01 Calculate area and volume.
- 34.02 Convert temperature.
- 34.03 Calculate velocities and flow rates.
- 34.04 Calculate detention time.
- 34.05 Calculate parts per million/pounds.
- 34.06 Calculate chemical concentrations.
- 34.07 Utilize conversion factors.
- 34.08 Calculate ratios and percentages.
- 34.09 Calculate water, brake and motor horsepower for chemical pumps.
- 34.10 Calculate force.
- 34.11 Calculate sedimentation and loading rates.
- 34.12 Use calculations to determine activated sludge characteristics.
- 34.13 Use calculations to determine sludge digestion characteristics.
- 34.14 Use a variety of problem-solving strategies such as drawing a diagram, making a chart, guessing-and-checking, solving a simpler problem, writing an equation working backwards, and creating a table.

35.0 Demonstrate industry specific science skills and techniques--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.L.18.12; SC.912.P.8.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11; SC.912.P.10.7

- 35.01 Differentiate between chemical and physical properties of solids, dissolved solids, gases and liquids.

- 35.02 Identify chemical symbols on the periodic table and explain their relationships.
 - 35.03 Interpret formula representations of molecules and compounds in water treatment.
 - 35.04 Characterize chemical reactions in water treatment processes for example redox, acid base, synthesis and single and double replacement reactions.
 - 35.05 Utilize the mole concept and the law of conservation of mass to calculate quantities of chemicals precipitating in reactions occurring in water treatment processes.
 - 35.06 Describe the properties of the water molecule.
 - 35.07 Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH in environmental processes.
 - 35.08 Distinguish between endothermic and exothermic chemical processes in environmental systems.
- 36.0 Identify career opportunities and organizational dynamics in water resources--The student will be able to:
- 36.01 Research and create a presentation about occupations in water resources.
 - 36.02 Determine the educational requirements and experience needed to enter and advance in water resource occupations
 - 36.03 Prepare a resume.
- 37.0 Demonstrate water treatment techniques--The student will be able to:
- This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1
- 37.01 Determine soil types, land slope, and other factors to consider in choosing a location for a manmade pond.
 - 37.02 Identify/explain environmentally safe methods of wastewater disposal.
 - 37.03 Identify and consult agencies regulating water quality standards in order to prevent compliance problems.
 - 37.04 Observe different stages of construction of ponds.
- 38.0 Discuss an industrial pretreatment program/inspection--The student will be able to:
- This standard supports the following Next Generation Sunshine State Standards:
SC.912.L.18.11; SC.912.N.1.1
- 38.01 Utilize spot location program.
 - 38.02 Survey business and industry water consumption and discharge.
 - 38.03 Conduct pretreatment sampling.
 - 38.04 Analyze data and document reports.
 - 38.05 Design monitoring plan.
 - 38.06 Monitor sites.
- 39.0 Discuss comprehensive quality assurance plan--The student will be able to:
- This standard supports the following Next Generation Sunshine State Standards:
MA.912.P.1.1

- 39.01 Discuss quality assurance rules.
- 39.02 Develop and follow standard operating procedures.
- 39.03 Describe preventative maintenance techniques.
- 39.04 Describe cleaning/decontamination techniques.
- 39.05 Determine accuracy and precision of sampling techniques.
- 39.06 Discuss need for corrective action.
- 39.07 Document Quality Assurance per regulatory agencies.

40.0 Use information technology tools--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
MA.912.A.3.11, 12;

- 40.01 Use Personal Information Management (PIM) applications to increase workplace efficiency. IT1.0
- 40.02 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications. IT2.0
- 40.03 Employ computer operations applications to access, create, manage, integrate, and store information. IT3.0
- 40.04 Employ collaborative/groupware applications to facilitate group work. IT4.0

41.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.E.7.7, 9; SC.912.L.17.11; SC.912.N.1.1, 4; SC.912.N.2.2; MA.912.A.10.1;
MA.912.A.8.1, 7;

- 41.01 Describe the nature and types of business organizations. SY1.0
- 41.02 Explain the effect of key organizational systems on performance and quality.
- 41.03 List and describe quality control systems and/or practices common to the workplace. SY2.0
- 41.04 Explain the impact of the global economy on business organizations.

42.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.E.5.10; SC.912.E.6.4; SC.912.E.7.8; SC.912.N.1.1, 4, 7;

- 42.01 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments. SHE1.0
- 42.02 Explain emergency procedures to follow in response to workplace accidents.
- 42.03 Create a disaster and/or emergency response plan. SHE2.0

43.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:

SC.912.N.1.1, 2, 3, 4, 5, 6, 7;

43.01 Employ leadership skills to accomplish organizational goals and objectives.
LT1.0

43.02 Establish and maintain effective working relationships with others in order to accomplish objectives and tasks. LT3.0

43.03 Conduct and participate in meetings to accomplish work tasks. LT4.0

43.04 Employ mentoring skills to inspire and teach others. LT5.0

44.0 Describe the importance of professional ethics and legal responsibilities--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.3, 4, 7; SC.912.N.2.2, 4, 5

44.01 Evaluate and justify decisions based on ethical reasoning. ELR1.0

44.02 Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies. ELR1.1

44.03 Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace. ELR1.2

44.04 Interpret and explain written organizational policies and procedures. ELR2.0

45.0 Explain the importance of employability skill and entrepreneurship skills--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1; SC.912.N.2.4, 5;

45.01 Identify and demonstrate positive work behaviors needed to be employable.
ECD1.0

45.02 Develop personal career plan that includes goals, objectives, and strategies.
ECD2.0

45.03 Examine licensing, certification, and industry credentialing requirements.
ECD3.0

45.04 Maintain a career portfolio to document knowledge, skills, and experience.
ECD5.0

45.05 Evaluate and compare employment opportunities that match career goals.
ECD6.0

45.06 Identify and exhibit traits for retaining employment. ECD7.0

45.07 Identify opportunities and research requirements for career advancement.
ECD8.0

45.08 Research the benefits of ongoing professional development. ECD9.0

45.09 Examine and describe entrepreneurship opportunities as a career planning option. ECD10.0

46.0 Demonstrate personal money-management concepts, procedures, and strategies--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.1, 5, 6, 7; SC.912.N.2.1, 2, 4, 5; SC.912.N.3.5; MA.912.A.1.1, 2, 3, 4, 5, 7, 13; MA.912.A.3.11, MA.912.A.10.1, 2, 3; MA.912.D.7.2; MA.912.F.3.6, 14; MA.912.F.4.1, 2, 3, 8, 10, 11, 12, 14; LA.910.3.1.3

- 46.01 Identify and describe the services and legal responsibilities of financial institutions. FL2.0
- 46.02 Describe the effect of money management on personal and career goals. FL3.0
- 46.03 Develop a personal budget and financial goals. FL3.1
- 46.04 Complete financial instruments for making deposits and withdrawals. FL3.2
- 46.05 Maintain financial records. FL3.3
- 46.06 Read and reconcile financial statements. FL3.4
- 46.07 Research, compare and contrast investment opportunities.

2012 – 2013

**Florida Department of Education
Student Performance Standards**

Course Title: **Advanced Environmental Water Reclamation Technology**
Course Number: **8007210**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the area of career opportunities, scientific concepts in water treatment, safety hazards, government regulations, facility operational principles, and equipment inspections. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Math		Science					
Algebra 1	**	Biology 1	**	Anatomy/Physiology Honors	**	Astronomy Solar/Galactic Honors	**
Algebra 2	**	Chemistry 1	**	Genetics	**	Marine Science 1 Honors	**
Geometry	**	Physics 1	**	Earth-Space Science	**	Physical Science	**

** Alignment pending

Alignment attempted, but no correlation to academic course.

47.0 Identify professions related to the water technology field.--The student will be able to:

- 47.01 List duties of water technology workers such as wastewater operator, water operator, systems operator, stormwater operator, residual (bio-solids) hauler operator, cross connection operator, pretreatment operator, and meter reading/maintenance operator.
- 47.02 Identify the basic terms and concepts involved in processes used in these professions.
- 47.03 List potential employers in the water technology field: federal, municipal, county, state and private.
- 47.04 Identify resources to assist in finding employment in the field.
- 47.05 Identify professional organizations related to the water technology field.
- 47.06 Identify career ladder levels in the water technology field: trainee, C Level, B Level, A Level.

48.0 Identify scientific concepts common in water and wastewater treatment.--The student will be able to:

- 48.01 Identify chemical symbols used in water and wastewater treatment.
- 48.02 Describe the hydrologic cycle.
- 48.03 Describe the basic concepts of the pH scale and its importance in the treatment process.
- 48.04 Identify the differences between mixtures, elements, and compounds, and organic and inorganic chemicals.

- 48.05 Identify principle states of matter: liquid, solid, and gas.
- 48.06 Identify the basic nitrogen, phosphorous, and carbon cycles.
- 49.0 Identify safety hazards associated with water technologies.--The student will be able to:
 - 49.01 Identify the types of hazards common to water technology facilities.
 - 49.02 Recognize unsafe conditions and prescribe corrective measures.
 - 49.03 Identify and safely handle hazardous chemicals common to water technology facilities.
 - 49.04 Recognize electrical hazards.
 - 49.05 Recognize fire hazards, identify types of fires, and describe appropriate extinguishing techniques.
- 50.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.--The student will be able to:
 - 50.01 Identify the kinds of information presented on Material Safety Data Sheets (MSDS).
 - 50.02 Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (chapter 442, F.S.).
- 51.0 Solve basic math problems common to water technologies.--The student will be able to:
 - 51.01 Perform basic arithmetic problems, including addition, subtraction, multiplication, division, fractions, decimals, percentages, rounding (significant figures), graphing, etc.
 - 51.02 Identify metric measurements and perform conversions.
 - 51.03 Perform calculations that involve areas, volumes, capacities, retention times, pounds, mg/L, velocities, flow rates, pressure, and head.
- 52.0 Define pumping and basic hydraulic principles.--The student will be able to:
 - 52.01 Identify types of pumps.
 - 52.02 Discuss application and use of different types of pumps.
 - 52.03 Identify components/characteristics of pumps including pump operation and basic pump curves including centrifugal pumps, positive displacement pumps, and air lift pumps.
 - 52.04 Identify types of pipes, valves, and fittings.
 - 52.05 Define cross connections.
 - 52.06 Identify the appropriate equipment used in the treatment processes.
- 53.0 Define principles of disinfection.--The student will be able to:
 - 53.01 List the need/reasons for disinfection (list of waterborne diseases).
 - 53.02 Define concepts related to disinfection.
 - 53.03 List methods and chemicals used in disinfection.
 - 53.04 Define the physical properties of chlorine.
 - 53.05 List kinds of disinfection equipment used.
- 54.0 Define sampling techniques.--The student will be able to:

- 54.01 Define the reasons for sampling and types of samples.
 - 54.02 Define methods of sample collection and handling.
 - 54.03 Define the basic procedure for quality control and quality assurance in sampling.
 - 54.04 Define the chain of custody for samples.
 - 54.05 Perform chlorine residual analysis.
 - 54.06 Perform pH analysis.
- 55.0 Define federal, state, and local regulations that apply to water technologies.--The student will be able to:
- 55.01 List regulatory agencies and their roles in monitoring the water technology field.
 - 55.02 Define regulations associated with the appropriate federal, state or local agencies.
 - 55.03 Define training and certification requirements for water technology workers.
- 56.0 Demonstrate employability skills.--The student will be able to:
- 56.01 Conduct a job search.
 - 56.02 Secure information about a job.
 - 56.03 Identify documents that may be required for a job application.
 - 56.04 Complete a job application.
 - 56.05 Demonstrate competence in job-interview techniques.
 - 56.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
 - 56.07 Identify acceptable work habits.
 - 56.08 Demonstrate knowledge of how to make job changes appropriately.
 - 56.09 Demonstrate acceptable employee-health habits for the treatment facility environment.
 - 56.10 Identify materials and documents needed for a professional library.
 - 56.11 Demonstrate productive and positive customer interactions.
 - 56.12 Demonstrate effective interpersonal communication skills.
- 57.0 Identify the basic characteristics and principles of wastewater treatment.--The student will be able to:
- 57.01 Identify the sources of wastewater and the objectives of wastewater treatment.
 - 57.02 Identify terms used in wastewater treatment.
 - 57.03 Identify the impact of wastewater on receiving bodies of water.
 - 57.04 Identify biological organisms present in treatment processes.
 - 57.05 Identify waterborne diseases.
 - 57.06 Identify commonly measured wastewater parameters.
 - 57.07 Identify factors affecting raw wastewater.
 - 57.08 Correlate treatment processes to types of facility influent and solids.
- 58.0 Identify sampling techniques and interpret the results.--The student will be able to:
- 58.01 Identify the reasons for sampling and the types of samples (e.g., simple, representative, grab, composite).
 - 58.02 Describe methods of sample collection and handling.

- 58.03 Identify specific samples (biological or chemical) and determine the significance of sample results required for process quality control, for compliance with standards, and for reporting.
 - 58.04 Identify representative sampling points.
 - 58.05 Identify the significance of the flow measurement on process control.
- 59.0 Describe the sources of wastewater and the types of collection systems.--The student will be able to:
- 59.01 Describe the types of wastewater collection systems.
 - 59.02 Identify flow variations and conditions that affect plant treatment, including infiltration, inflow, and lift stations.
 - 59.03 Identify methods to detect and correct infiltration.
 - 59.04 Identify dissolved gases in wastewater and the effect of their presence/absence on treatment.
- 60.0 Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management.--The student will be able to:
- 60.01 Describe concepts related to preliminary and primary treatment.
 - 60.02 Describe the types of preliminary treatment equipment, the way they function, and the relationship of each to the treatment train.
 - 60.03 Describe the types of primary treatment equipment, the way they function, and the relationship of each to the treatment train.
 - 60.04 Describe concepts related to secondary treatment, including attached growth processes, suspended growth processes, aeration, and clarification.
 - 60.05 Describe the types of secondary treatment equipment, the way they function, and the relationship of each to the treatment train.
 - 60.06 Describe concepts related to tertiary treatment processes, including sand filtration, nitrification/denitrification, oxic/anoxic, activated carbon, and artificial wetlands.
 - 60.07 Describe the types of tertiary treatment equipment, the way they function, and the relationship of each to the treatment train.
 - 60.08 Describe concepts related to disinfection and effluent disposal, including surface water, reuse reclamation, deep well, and ocean outfall.
 - 60.09 Describe the types of disinfection and the types of effluent-disposal equipment, the way they function, and the relationship of each to the system.
 - 60.10 Describe concepts related to solids management, including thickening, aerobic and anaerobic digestion, stabilization, de-watering, and reuse.
 - 60.11 Describe the types of solids-management equipment, the way they function, and the relationship of each to the system.
- 61.0 Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management.--The student will be able to:
- 61.01 Describe the grit-removal process and the operational efficiency of each step.
 - 61.02 Describe the laboratory tests performed on influent.
 - 61.03 Describe the primary-clarifier removal efficiencies, including settleable solids, suspended solids, total solids, BOD, and bacteria.

- 61.04 Describe sampling points, frequency of sampling, and the laboratory tests and results that are used for the proper operation of the primary clarifier.
 - 61.05 Select and plot on a trend chart the parameters for primary clarification.
 - 61.06 Use the operational data required to evaluate the performance of secondary-treatment processes, including attached growth, suspended growth, aeration, and clarification.
 - 61.07 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for proper operation of the secondary-treatment processes.
 - 61.08 Select and plot on a trend chart the parameters for secondary clarification.
 - 61.09 Describe how nitrification affects secondary processes and clarification.
 - 61.10 Describe how denitrification affects secondary processes and clarification.
 - 61.11 Use operational data to evaluate the performance of sand filtration.
 - 61.12 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for checking the proper operation of sand filtration. Select and plot on a trend chart the parameters for sand filtration.
 - 61.13 Use operational data to evaluate the nitrification/denitrification process.
 - 61.14 Use operational data to evaluate the performance of effluent-disposal processes, including disinfection and dechlorination.
 - 61.15 Describe sampling points, the frequency of sampling, and the laboratory tests used for checking the proper operation of effluent disposal.
 - 61.16 Select and plot on a trend chart the parameters for effluent disposal.
 - 61.17 Describe various methods of effluent disinfection including UV, chlorination, and ozonation.
 - 61.18 Describe the chemical and physical properties of chlorine, and describe the reactions of chlorine with water, ammonia compounds, and sulfides.
 - 61.19 Describe the safe storage and handling of chlorine, including the use of testing compounds.
 - 61.20 Explain the points of application of chlorine in wastewater treatment.
 - 61.21 Describe the methods of dechlorination.
 - 61.22 Describe the methods commonly used to dispose of wastewater effluents, including reuse applications.
 - 61.23 Describe the laboratory tests commonly used on the reuse of effluent.
 - 61.24 Describe the types of sludge and their characteristics.
 - 61.25 Use operational data to evaluate the performance of solids management, including sludge thickening, digestion, de-watering, and disposal processes.
 - 61.26 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for checking the proper operation of solids management and for compliance with Chapter 62-640 F.A.C.
- 62.0 Perform equipment inspection, and identify basic maintenance for the treatment train, effluent disposal, and solids management.--The student will be able to:
- 62.01 Identify the appropriate equipment used in the treatment train, effluent disposal, and solids management.
 - 62.02 Describe a preliminary site inspection of the equipment used in the treatment train, effluent disposal, and solids management.
 - 62.03 Identify the maintenance needs of equipment used in the treatment train, effluent disposal, and solids management, including safe procedures for maintenance.
 - 62.04 Describe proper record keeping for preventive and corrective maintenance.
 - 62.05 Describe preventive and corrective maintenance procedures for equipment used in the treatment process, effluent disposal, and solids management.

- 63.0 Identify and correct facility operational problems.--The student will be able to:
- 63.01 Describe common facility operational problems in the treatment train, effluent disposal, and solids management.
 - 63.02 Describe methods to evaluate operational problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.
 - 63.03 Select appropriate corrective actions for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.
 - 63.04 Describe the methods for monitoring results of corrective action taken for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.
- 64.0 Identify appropriate federal, state, and local regulations.--The student will be able to:
- 64.01 Identify federal, state and local regulations that apply to the operation of a wastewater-treatment facility.
 - 64.02 Describe the operator's duties and responsibilities, certification requirements, testing, renewal, staffing, and facility classification (sections of Chapter 62-602 F.A.C.).
 - 64.03 Explain and describe the contents of an operating permit.
 - 64.04 Identify state regulations that apply to procedures such as reclaimed water, reuse, and residuals management.
- 65.0 Describe federal, state and local laws for the handling, storage, and use of toxic and hazardous materials. – The student will be able to:
- 65.01 Identify the kinds of information presented on the MSDS.
 - 65.02 Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (Chapter 442, F.S.).
 - 65.03 Identify the reporting requirements as specified in SARA Title III and Chapter 252, F.S.
 - 65.04 Describe the responsibilities toward the community as specified in SARA Title III and Chapter 252, F.S.