Florida Department of Education
Curriculum Framework

Program Title: **Scientific Workplace Preparation**
Career Cluster: **Manufacturing**

CCC	
CIP Number	0641030102
Program Type	College Credit Certificate (CCC)
Program Length	26 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	19-4031 – Chemical Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Chemical Technology AS degree program (1641030100).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 manufacturing 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 manufacturing career cluster.

The content includes but is not limited to development of communication skills, mathematical skills, computer skills, a basic knowledge of scientific concepts in addition to modeling ethical responsibility. The program completer will be able to assist scientist by performing basic scientific laboratory tests for various purposes such as quality control monitoring of on-going production operations, research and development, and the maintenance of health and safety standards in the laboratory.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Standards

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

01.0 Demonstrate appropriate written and oral communication skills.
02.0 Demonstrate appropriate mathematical skills to solve basic problems in the sciences.
03.0 Demonstrate appropriate interpersonal skills, decision-making strategies, and awareness of self-worth, ethics and values.
04.0 Demonstrate computer competence.
05.0 Demonstrate basic knowledge of scientific concepts.
06.0 Demonstrate basic knowledge of chemical concepts.

Florida Department of Education
Student Performance Standards

Program Title: **Scientific Workplace Preparation**
CIP Number: **0641030102**
Program Length: **26 credit hours**
SOC Code(s): **19-4031**

This certificate program is part of the Chemical Technology AS degree program (1641030100). At the completion of this program, the student will be able to:	
01.0	Demonstrate appropriate written and oral communication skills.--The student will be able to:
01.01	Write logical, readable, and understandable sentences and paragraphs.
01.02	Carefully read, accurately follow, and demonstrate an understanding of written instructions, standard operating procedures, and accepted manufacturing practices.
01.03	Read and evaluate ideas recognizing assumptions and implications.
01.04	Carefully follow and deliver oral instructions and other spoken information related to the workplace.
01.05	Prepare, outline, and deliver a short oral presentation.
01.06	Participate in group discussion as a member and as a leader.
01.07	Prepare visual material to support an oral presentation.
01.08	Answer and ask questions coherently and concisely.
01.09	Give clear, concise instructions.
01.10	Read technical manuals, reports and journals.
01.11	Read and prepare diagrams and charts.
01.12	Maintain legibly written logs and notes.
01.13	Keep detailed and accurate records.
01.14	Maintain an accurate and legible notebook.
01.15	Accurately report data.
01.16	Write detailed standard operating procedures.
01.17	Professionally compose memos, letters, and reports.
02.0	Demonstrate appropriate mathematical skills to solve basic problems in the sciences.--The student will be able to:
02.01	Calculate ratios.
02.02	Perform unit conversions.

	02.03 Perform calculations using exponents and exponential functions
	02.04 Perform calculations using logarithms and logarithmic functions.
	02.05 Use appropriate significant figures.
	02.06 Recognize patterns in data.
	02.07 Solve single-unknown algebraic equations.
	02.08 Accurately interpret and construct graphs.
	02.09 Plot data, calculate slopes and intercepts of linear graphs.
	02.10 Perform calculations using roots. (square, cube, etc.)
	02.11 Solve simultaneous equations.
	02.12 Solve quadratic equations.
	02.13 Solve word problems using arithmetic and algebra.
03.0	Demonstrate appropriate interpersonal skills, decision-making strategies, and awareness of self-worth, ethics and values.--The student will be able to:
	03.01 Discuss the importance of teamwork and have experience working as a member of a team for planning, performing, analyzing, and reporting.
	03.02 Demonstrate critical thinking skills.
	03.03 Demonstrate high ethical standards in all aspects of work.
	03.04 Apply quality principles to all aspects of work.
	03.05 Recognize sources and symptoms of stress and learn how to manage one's response to it.
	03.06 Determine the importance of initiative and responsibility and examine the possible repercussions of action vs. non-action.
	03.07 Demonstrate the ability to problem solve effectively and resolve typical workplace conflicts.
	03.08 Apply decision-making strategies to workplace situations.
	03.09 Explain the basis for employer expectations: the written and unwritten "rules for success."
	03.10 Recognize the "culture" of an organization or employer and evaluate its impact on the individual.
	03.11 Develop an awareness of diversity and multi-culturalism.
04.0	Demonstrate computer competence.--The student will be able to:
	04.01 Demonstrate use of computer hardware and peripherals.
	04.02 Demonstrate appropriate use of computer software applications and tools.
05.0	Demonstrate basic knowledge of scientific concepts.--The student will be able to:
	05.01 Discuss the scientific method.

	05.02	Understand the need to organize and classify natural phenomena.
	05.03	Discuss relationships between characteristics of natural phenomena.
	05.04	Dissect a natural system into its component parts
	05.05	Model natural phenomena.
	05.06	Understand that nature behaves in predictable ways.
	05.07	Discuss methods of observing natural changes, from extremely slow changes to extremely fast changes.
	05.08	Discuss the variation of naturally occurring phenomena
	05.09	Discuss the diversity found within classes of natural organisms
06.0	Demonstrate basic knowledge of chemical concepts.--The student will be able to:	
	06.01	Write chemical formulas and use correct chemical nomenclature for inorganic compounds.
	06.02	Classify inorganic compounds according to a variety of chemical and physical properties.
	06.03	Name and write the symbols for the elements and describe characteristics of the common groupings of elements.
	06.04	Describe the basic reactions that occur between commonly used chemical substances.
	06.05	Read, write, balance and interpret chemical equations.
	06.06	Solve a variety of basic chemical problems using equations and/or dimensional analysis.
	06.07	Classify chemicals according to reactivity.
	06.08	Demonstrate knowledge of chemical composition and stoichiometry.
	06.09	Demonstrate an understanding of empirical gas laws and theory relating to the behavior of gases.
	06.10	Demonstrate a basic understanding of energy as it relates to chemical and other processes.
	06.11	Demonstrate a basic understanding of the laws and theories relating to the structure of the atom and how this relates to the Periodic Table.
	06.12	Demonstrate a basic understanding of molecular structure and chemical bonding,
	06.13	Describe the structure and properties of liquids and solids.
	06.14	Describe solutions and their properties, and perform calculations involving solution concentrations, composition and colligative properties.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

SkillsUSA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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 counselor and/or instructors. 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.

Additional Resources

For additional information regarding Articulation Agreements; Bright Futures Scholarships; Fine Arts/Practical Arts Credit; and Equivalent Mathematics and Equally Rigorous Science Courses please refer to:

http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml