

Florida Department of Education
Curriculum Framework

Program Title: Fire Science Technology
Career Cluster: Law, Public Safety and Security

AS

CIP Number	1743020112
Program Type	College Credit
Standard Length	60 credit hours
CTSO	N/A
SOC Codes (all applicable)	33-1021 Municipal Fire Fighting and Prevention Supervisors
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

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 Law, Public Safety and Security 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 Law, Public Safety and Security career cluster.

The purpose of this program is to prepare students for employment as Firefighting and Prevention Supervisors (SOC 33-1021) to supervise or manage firefighters who control and extinguish fires, protect life and property, and conduct rescue efforts. The program may also be beneficial to professionals seeking incentive benefits or career enhancement in the field.

This program does not prepare students for certification as fire fighters. A student must successfully complete the basic recruit program in firefighting to become certified, pursuant to Chapter 633, Florida Statutes.

This program does not complete the requirements to be eligible to sit for Bureau of Fire Standards and Training (BFST) certification exams. A student must contact the Bureau of Fire Standards and Training (BFST) for additional requirements.

Program Structure

This program is a planned sequence of instruction consisting of 60 credit hours.

Reinforcement of basic skills in English, mathematics, and science appropriate for the job preparatory programs is provided through vocational classroom instruction and applied laboratory procedures or practice. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the public service industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues.

Standards

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

- 01.0 Explore the theories and fundamentals of how and why fires start, spread, and how they are controlled.
- 02.0 Comprehend the concepts of building construction components and techniques related to fire and life safety.
- 03.0 Understand the history and philosophy of fire prevention, including code enforcement, public information, organization and operation of a fire prevention bureau, utilization of fire codes, identification and correction of fire hazards, and the relationships of fire prevention with built-in fire protection systems, fire investigation, and fire and life-safety education.
- 04.0 Understand the principles of the use of water in fire protection and how to apply hydraulic principles to analyze and to solve water supply problems
- 05.0 Describe the features of design and operation of fire alarm systems, water-based fire suppression systems, special hazard fire suppression systems, and water supply for fire protection and portable fire extinguishers.
- 06.0 Discuss fire protection; career opportunities in fire protection and related fields; philosophy and history of fire protection/service; fire loss analysis; organization, management, and function of public and private fire protection services; fire departments as part of local government; laws and regulations affecting the fire service; fire service nomenclature; specific fire protection functions; and introduction to fire strategy and tactics.
- 07.0 Examine the organization and management of a fire department and the relationship of government agencies to the fire service.
- 08.0 Define risk evaluation and control procedures for fire stations, training sites, emergency vehicles, and emergency situations involving fire, EMS, hazardous materials, terrorism, and technical rescue.
- 09.0 Discuss the federal, state, and local laws that regulate emergency services, national standards influencing emergency services, standard of care, tort, liability, and a review of court cases.
- 10.0 Analyze the principles of fire control through utilization of personnel, equipment, and extinguishing agents on the fire ground
- 11.0 Identify the fundamentals and technical knowledge needed for proper fire scene interpretations, including recognizing and conducting origin and cause, preservation of evidence and documentation, scene security, motives of the fire setter, and types of fire causes.
- 12.0 Comprehend basic chemistry relating to the categories of hazardous materials including problems of recognition, reactivity, and health encountered by firefighters.
- 13.0 Describe and discuss methods of instruction involved in planning and conducting an effective training program for adult learners.

Florida Department of Education
Student Performance Standards

Program Title: Fire Science Technology
 CIP Numbers: 1743020112
 Program Length: 60 credit hours
 SOC Code(s): 33-1021

Refer to Rule 6A-14.030 (4), F.A.C., for the minimum amount of general education coursework required in the Associate of Science (AS) degree. At the completion of this program, the student will be able to:

01.0	Explore the theories and fundamentals of how and why fires start, spread, and how they are controlled. The student will be able to:
01.01	Identify physical properties of the three states of matter.
01.02	Describe the components of fire.
01.03	Recall the physical and chemical properties of fire.
01.04	Describe the basic terms and concepts associated with the chemistry and dynamics of fire and combustion.
01.05	Discuss various materials and their relationship to fires as fuel.
01.06	Summarize the characteristics of water as a fire suppression agent.
01.07	Discuss other-than-water suppression agents and strategies.
01.08	Compare methods and techniques of fire extinguishments.
02.0	Comprehend the concepts of building construction components and techniques related to fire and life safety. The student will be able to:
02.01	Describe building construction components and techniques as they relate to building codes, fire and life-safety codes, fire prevention and inspection, firefighter safety, and firefighting strategy and tactics.
02.02	Distinguish the Classifications of major types of building construction as applicable with “model” building codes.
02.03	Interpret the hazards and tactical considerations associated with the various types of building construction.
02.04	Analyze the different loads and stresses that are placed on a building and their interrelationships.
02.05	Describe principle structural components in a typical building design.
02.06	Explain the function of each building design.
02.07	Compare defined differences in fire resistance construction, the flame spread within building types, and describe the testing procedures used to establish ratings for each.

02.08	Classify occupancy designations of the building and fire code.
02.09	Identify the indicators of potential structural failure as they relate to firefighter safety.
02.10	Analyze the causes involved in the line of duty firefighter deaths related to structural firefighting and building collapse.
03.0	Understand the history and philosophy of fire prevention, including code enforcement, public information, organization and operation of a fire prevention bureau, utilization of fire codes, identification and correction of fire hazards, and the relationships of fire prevention with built-in fire protection systems, fire investigation, and fire and life-safety education. The student will be able to:
03.01	Define the national fire problem and main issues relating thereto and the role of fire prevention.
03.02	Analyze the need, responsibilities, and importance of fire prevention as part of an overall mix of fire protection.
03.03	Discuss minimum professional qualifications at the state and national level for Fire Inspector, Fire Investigator, and Public Educator.
03.04	Define the functions of a fire prevention bureau as well as the elements of a plan review program.
03.05	Identify the laws, rules, codes, and other regulations relevant to fire protection of the authority having jurisdiction.
03.06	Discuss training programs and media programs for fire prevention.
03.07	Describe the history and philosophy of fire prevention.
03.08	Discuss the major programs for public education.
03.09	Identify the methods of effective management of life and fire-safety programs.
04.0	Understand the principles of the use of water in fire protection and how to apply hydraulic principles to analyze and to solve water supply problems. The student will be able to:
04.01	Apply mathematics and physics to the movement of water for fire suppression activities.
04.02	Explain the design principles of fire service pumping apparatus.
04.03	Describe the basic elements of a public water supply system including sources, distribution networks, piping, hydrants and the community fire flow demand criteria.
04.04	Describe the principles of forces that affect water at rest and in motion.
05.0	Describe the features of design and operation of fire alarm systems, water-based fire suppression systems, special hazard fire suppression systems, and water supply for fire protection and portable fire extinguishers. The student will be able to:
05.01	Explain the benefits of fire protection systems in various types of structures.
05.02	Analyze the elements of a public water supply system.
05.03	Explain why water is a widely used extinguishing agent and how water extinguishes fires.

05.04	Identify the different types and components of sprinkler, standpipe and foam systems.
05.05	Define the benefits of residential sprinkler legislation in NFPA 13.
05.06	Identify sprinkler design requirements for residential occupancies NFPA 13R.
05.07	Analyze the different types of non-water-based fire suppression systems and how these extinguish fire.
05.08	Describe the basic components of a fire alarm system.
05.09	Compare defined differences in fire resistant construction and the flame spread within building types.
05.10	Describe testing procedures used to establish ratings for fire resistance and flame spread.
05.11	Analyze different types of fire and smoke detectors and how they detect fire.
05.12	Describe the hazards of smoke and the factors that can influence smoke movement in a building.
05.13	Recognize the appropriate application of the different sprinkler-system designs and head types.
05.14	Explain the operation and appropriate application for the different types of portable fire extinguishing systems.
05.15	Identify portable fire extinguisher inspection and testing requirements for all types of extinguishers.
06.0	Discuss fire protection; career opportunities in fire protection and related fields; philosophy and history of fire protection/service; fire loss analysis; organization, management, and function of public and private fire protection services; fire departments as part of local government; laws and regulations affecting the fire service; fire service nomenclature; specific fire protection functions; and introduction to fire strategy and tactics. The student will be able to:
06.01	Discuss the components of the history and philosophy of the modern day fire service.
06.02	Describe the fire service training requirements; standards and laws associated with training; and the value of higher-education in the fire service.
06.03	Identify local, regional, state, and national organizations that provide emergency response service and their interrelation to how they impact policies rules, training and laws.
06.04	Identify fire protection and emergency-service careers in both the public and in the private sector.
06.05	Describe the scope, purpose, and organizational structure of fire and emergency services organizations.
06.06	Describe the common types of fire and emergency services facilities, equipment, and apparatus.
06.07	Compare and contrast effective management concepts for various emergency situations.
07.0	Examine the organization and management of a fire department and the relationship of government agencies to the fire service. The student will be able to:
07.01	List employment opportunities in public safety as well as the prerequisites required to be considered for the positions in the field.

07.02	Identify Public Safety career development practices.
07.03	Analyze written and verbal communication skills and their importance in public safety.
07.04	Describe the concepts of span and control, effective delegation and division of labor management principles and concepts.
07.05	Recognize appropriate appraising and disciplinary actions and the impact on employee behavior.
07.06	Summarize the history and development of management and supervision.
07.07	Describe methods of managing available resources.
07.08	Identify roles and responsibilities of fire department personnel and management/leadership positions.
07.09	Compare and contrast the traits of effective versus ineffective supervision and management styles.
07.10	Analyze safety needs for both emergency and non-emergency situations.
07.11	Defend the importance of ethics in the public safety work environment as they apply to supervisors.
07.12	Identify the roles of company officers in current Incident Command/Management systems to include: ICS, NIMS, and Unified Command.
07.13	Discuss business writing principles, report writing, and recording concepts through appropriate documentation.
07.14	Demonstrate the legal requirements for the fire department reports and forms using effective writing techniques.
08.0	Define risk evaluation and control procedures for fire stations, training sites, emergency vehicles, and emergency situations involving fire, EMS, hazardous materials, terrorism, and technical rescue. The student will be able to:
08.01	Analyze the history of wellness and safety programs versus today
08.02	Identify occupational wellness and safety programs for the emergency services.
08.03	Describe the distinction between standards and regulations.
08.04	Identify regulations and standards that impact on health and safety programs.
08.05	Identify the concepts of risk identification and risk evaluation.
08.06	Describe the components of an effective response safety plan to include fire stations and emergency response vehicles.
08.07	Describe the components of the pre-incident planning process.
08.08	Describe the considerations for safety while training.
08.09	Discuss the value of personal protective equipment.

08.10	Describe the components of accountability system in emergency operations.
08.11	Define incident priorities and how they relate to health and safety.
08.12	Describe the relationship of incident management as it relates to health and safety.
08.13	Describe the methods of controlling hazards associated with responding to EMS, hazmat, terrorism related events, and technical rescue incidents.
08.14	Explain the purpose and process for post-incident analysis.
08.15	Describe the components and value of critical incident stress management programs.
08.16	Describe the responsibilities of individual responders, supervisors, safety officers, and incident commanders, safety program managers, safety committees and fire department managers as they relate to health and safety programs.
08.17	Describe the responsibility of a safety officer as established within the Incident Command System (ICS).
08.18	Describe the components of a wellness/fitness plan.
09.0	Discuss the federal, state, and local laws that regulate emergency services, national standards influencing emergency services, standard of care, tort, liability, and a review of court cases. The student will be able to:
09.01	Discuss the different types of laws, their basic differences, and how the law functions in society.
09.02	Describe federal, state, and local laws, which regulate or influence emergency services.
09.03	Explain the role and purpose of national codes and standards concerning their legal influence on public safety.
09.04	Discuss legal decisions affecting the management, training, equipment and response procedures of the fire service.
09.05	Discuss the organization and legal structure of the fire department.
09.06	Analyze the legal duties of emergency service members to include liabilities and negligence.
09.07	Define discrimination and identify areas of potential discrimination in the emergency service as it relates to state and federal laws.
09.08	Analyze the legalities of public safety employment entrance requirements, residency, grooming and drug testing.
09.09	Discuss the scope of the civil rights act.
09.10	Explain the federal and state employment laws including the basic intent of the Fair Labor Standards Act, Americans with Disabilities Act (ADA), and Family Medical Leave Act (FMLA).
09.11	Define the at-will doctrine for employment.
09.12	Discuss the purpose of labor and employment laws.
10.0	Analyze the principles of fire control through utilization of personnel, equipment, and extinguishing agents on the fire ground. The student will be able to:

10.01	Explain the main components of pre-fire planning and can identify steps to complete a pre-fire plan review.
10.02	Explain building construction and components and how they interrelate to pre-fire planning.
10.03	Identify steps taken during size-up and recognize the order in which they will take place at an incident.
10.04	Describe concepts for effectiveness of fire ground communications.
10.05	Define the main functions within an IMS system and how they interrelate during an incident.
10.06	Identify concepts for managing resources for expanding incidents.
11.0	Identify the fundamentals and technical knowledge needed for proper fire scene interpretations, including recognizing and conducting origin and cause, preservation of evidence and documentation, scene security, motives of the fire setter, and types of fire causes. The student will be able to:
11.01	Identify the responsibilities of a firefighter when responding to the scene of a fire.
11.02	Describe the implications of constitutional amendments as they apply to fire investigations.
11.03	Identify key case law decisions that have affected fire investigations.
11.04	Define the common terms used in fire investigations.
11.05	Assess and compare the major (USFA-NFPA) fire data collection systems, methods, and analytical techniques used to quantify and qualify the nation's fire loss experience.
11.06	Explain how the basic elements of fire dynamics affect cause determination.
11.07	Describe how fire progression is affected by fire protection systems and building construction and design.
11.08	Discuss the basic principles of electricity as an ignition source.
11.09	Describe the process of conducting investigations using the scientific method.
11.10	Identify the characteristics of an incendiary fire and common motives of the fire setter.
11.11	Compare and contrast local, state, or national fire data trends related to fire cause, property type, deaths, injuries, and dollar loss as a result of both accidental fires and arson.
12.0	Comprehend basic chemistry relating to the categories of hazardous materials including problems of recognition, reactivity, and health encountered by firefighters. The student will be able to:
12.01	Identify the common elements by their atomic symbols on the Periodic Table.
12.02	Discuss why the Periodic Table is organized into columns and groups.
12.03	Identify elements, compounds and mixtures.

12.04	Explain the difference between ionic and covalent bonding and how to predict when each will occur.
12.05	Summarize the basic chemistry involved with common hydrocarbon derivatives.
12.06	Explain basic chemical and physical properties of gases, liquids and solids, and how to predict the behavior of a substance under adverse condition.
12.07	Describe the basic chemistry and hazards involved with the nine U.S. Department of Transportation hazard classes and their divisions.
12.08	Explain how facility occupancy, transportation documents, shape and size of containers, and Safety Data Sheets (SDS) relate to recognizing the physical state and potential hazards of reactivity related to firefighter wellness and safety.
12.09	Demonstrate the ability to utilize guidebooks and determine an initial course of action for emergency responders.
13.0	Describe and discuss methods of instruction involved in planning and conducting an effective training program for adult learners. . The student will be able to:
13.01	Define various roles and characteristics of an instructor.
13.02	Describe the responsibilities of an instructor.
13.03	Explain how ethics influence students and instruction in a classroom.
13.04	Explain legal issues faced by instructors.
13.05	Identify difficult students and how to deal with them.
13.06	Describe types of feedback.
13.07	Discuss the instructor's role in safety in the classroom.
13.08	Describe and discuss the characteristics and motivation of adult learners.
13.09	Define the four levels of evaluation.
13.10	Describe the elements of an effective training program.
13.11	Identify questions that should be asked when planning a training program.
13.12	List methods used to evaluate a program.
13.13	Identify the components of a training proposal.
13.14	Recognize what needs to be kept in training records.
13.15	Identify concerns when choosing instructors and facilities.

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.

Special Notes

This program does not complete the requirements to be eligible to sit for Bureau of Fire Standards and Training (BFST) certification exams. A student must contact the Bureau of Fire Standards and Training (BFST) for additional requirements.

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.

Certificate Programs

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 AS degree program includes the following College Credit Certificates:

Fire Officer Supervisor (0743020111) – 12 credit hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

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>