

Fire Science II

Primary Career Cluster:	Law, Public Safety, Corrections, & Security
Program Manager:	Sloan Hudson, (615) 532-2839, Sloan.Hudson@tn.gov
Course Code(s):	6153
Prerequisite(s):	<i>Fire Science I</i> (6152)
Credit:	1
Grade Level:	12
Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Law, Public Safety, Corrections, & Security courses.
Programs of Study and Sequence:	This is the fourth and final course in the <i>Fire Management Services</i> program of study.
Aligned Student Organization(s):	SkillsUSA: http://tnskillsusa.com/ Tracy Whitehead, (615) 532-2804, Tracy.Whitehead@tn.gov
Coordinating Work-Based Learning:	Teachers are encouraged to use embedded WBL activities such as informational interviewing, job shadowing, and career mentoring. For information, visit https://www.tn.gov/education/career-and-technical-education/work-based-learning.html
Available Student Industry Certifications:	Firefighter I
Dual Credit or Dual Enrollment Opportunities:	There are dual credit/dual enrollment opportunities for this course. If interested, reach out to a local postsecondary institution to establish an articulation agreement.
Teacher Endorsement(s):	751
Required Teacher Certifications/Training:	Tennessee Fire Commission Firefighter Instructor 1
Teacher Resources:	https://www.tn.gov/content/dam/tn/education/ccte/cte/cte_resource_law.pdf

Course Description

Fire Science II is the fourth and final course in the *Fire Management Services* program of study. Students in this course continue to acquire the skills and knowledge needed to pursue a career as a Firefighter I. Those students who complete this course will be prepared, after graduation, to further their instruction at a training facility. Upon completion of this course, proficient students will be able to correctly demonstrate skills associated with ventilation, water supply, fire hose and fire streams in a non-live fire situation, and safety with hazardous materials. Standards in this course are aligned with National Fire Academy Fire and Emergency Services (FESHE) model.

Program of Study Application

This is the fourth and final course in the *Fire Management Services* program of study. For more information on the benefits and requirements of implementing this program in full, please visit the Law, Public Safety, Corrections, & Security website at <https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-law-public-safety.html>

Course Standards

Cultural and Behavioral Aspects of Fire Science (16 Life Safety Initiatives)

- 1) Define and describe the need for cultural and behavioral change within the emergency services relating to safety, incorporating leadership, supervision, accountability, and personal responsibility. (FESHE Principles of Fire and Emergency Services Safety and Survival 1)
- 2) Explain the need for enhancements of personal and organizational accountability and personal responsibility. (FESHE Principles of Fire and Emergency Services Safety and Survival 2)
- 3) Define how the concepts of risk management affect strategic and tactical decision making. (FESHE Principles of Fire and Emergency Services Safety and Survival 3)
- 4) Describe and evaluate circumstances that might constitute an unsafe act. (FESHE Principles of Fire and Emergency Services Safety and Survival 4)
- 5) Explain the concept of empowering all emergency services personnel to stop unsafe acts. (FESHE Principles of Fire and Emergency Services Safety and Survival 5)
- 6) Validate the need for national training standards as they correlate to professional development inclusive of qualifications, certifications, and re-certifications. (FESHE Principles of Fire and Emergency Services Safety and Survival 6)
- 7) Defend the need for annual medical evaluations and the establishment of physical fitness criteria for emergency services personnel throughout their careers. (FESHE Principles of Fire and Emergency Services Safety and Survival 7)
- 8) Explain the vital role of local departments in national research and data collection systems. (FESHE Principles of Fire and Emergency Services Safety and Survival 8)
- 9) Illustrate how technological advancements can produce higher levels of emergency services safety and survival. (FESHE Principles of Fire and Emergency Services Safety and Survival 9)
- 10) Explain the importance of investigating all near-misses, injuries, and fatalities. (FESHE Principles of Fire and Emergency Services Safety and Survival 10)
- 11) Discuss how incorporating the lessons learned from investigations can support cultural change throughout the emergency services. (FESHE Principles of Fire and Emergency Services Safety and Survival 11)

- 12) Describe how obtaining grants can support safety and survival initiatives. (FESHE Principles of Fire and Emergency Services Safety and Survival 12)
- 13) Formulate an awareness of how adopting standardized policies for responding to emergency scenes can minimize near-misses, injuries, and death. (FESHE Principles of Fire and Emergency Services Safety and Survival 13)
- 14) Explain how the increase in violent incidents impacts safety for emergency services personnel when responding to emergency scenes. (FESHE Principles of Fire and Emergency Services Safety and Survival 14)
- 15) Describe the importance of public education as a critical component of life safety programs. (FESHE 1-18)

Building Construction and Codes

- 16) Describe the common building materials and articulate the hazards that firefighters will encounter with each. Incorporate appropriate construction terms for each material discussed. Describe building construction as it relates to firefighter safety, building codes, fire prevention, code inspection, firefighting strategy, and tactics. (FESHE Building Construction 1)
- 17) NFPA 220, *Standard on Types of Building Construction*, outlines the five types of building construction. Summarize each type, the materials involved, the structural strengths and weakness of each, and the associated hazards that firefighters can expect to encounter. Identify the function of each principle structural component in typical building design. Estimate the growth and development of a fire according to the type of building construction. (FESHE Building Construction 3, 5)
- 18) Explain the different loads and stresses that are placed on a building and their interrelationships. (FESHE Building Construction 4)
- 19) Classify major types of building construction in accordance with a local/model building code. Classify occupancy designations of the building code.(FESHE Building Construction 2, 7)
- 20) Identify dangerous building conditions created by fire and fire suppression activities, including conditions that contribute to the spread and intensity of the fire, conditions that make the building susceptible to collapse, and the hazards associated with lightweight materials and truss construction. Identify the indicators of potential structural failure as they relate to firefighter safety. (FESHE Building Construction 8)
- 21) Articulate common hazards related to electrical emergencies, and demonstrate acceptable procedures for shutting off electricity to a burning building.
- 22) Identify the role of GIS as it relates to building construction. (FESHE Building Construction 9)

Rescue and Extrication

- 23) Develop a mock scenario in which a search and rescue would be performed in a burning structure. Outline search and safety guidelines for both victims and firefighters, procedures for obtaining information about persons in the building, the process for conducting a primary and a secondary search, and victim removal methods. Describe search methods for each room of a building and employ standard marking systems. Demonstrate the skill of exiting a hazardous area.
- 24) Evaluate research on the topic of firefighters becoming disoriented, lost, or trapped in a burning building in order to identify possible preventive measures or strategies. Cite effective rapid intervention strategies to rescue a firefighter in trouble.
- 25) Follow precisely a complex multistep procedure when performing skills in a rescue situation, such as:
 - a. Incline drag
 - b. Webbing drag
 - c. Cradle-in-arms lift/carry-one-rescuer method
 - d. Cradle-in-arms lift/carry-two-rescuer method
 - e. Chair lift/carry method - two rescuers

Operations at a Hazmat Incident

Skills related to Hazmat operations will be performed at a training center after student has graduated.

- 26) Create a mock scenario surrounding potential involvement with hazardous materials. Within the scenario, outline the incident priorities, management structure or jurisdiction, and incident mitigation protocols such as analyzing the situation, planning the appropriate response, implementing the incident action plan, and evaluating progress.
- 27) Identify the strategic goals and tactical objects of incidents related to a hazardous situation, including but not limited to the following components:
 - a. Isolation and scene control
 - b. Notification
 - c. Identification
 - d. Protection of responders and the public
 - e. Decontamination
 - f. Rescue
 - g. Spill control and leak contamination
 - h. Fire control
 - i. Crime scene management and evidence preservation
 - j. Recovery and termination

Standards Alignment Notes

*References to other standards include:

- National Fire Academy Fire and Emergency Services Higher Education (FESHE): [Core Curriculum](#). This course aligns with FESHE Principles of Fire and Emergency Services Safety and Survival.

- Cultural and Behavioral Aspects of Fire Science (16 Life Safety Initiatives)
<http://www.everyonegoeshome.com/16-initiatives/>
- P21: Partnership for 21st Century Skills [Framework for 21st Century Learning](#)
 - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.
- National Fire Protection Association (NFPA) [Fire Fighter Professional Qualifications](#)