

Fire Technology

| American River College

This program was established under the direction of the California Fire Technology Directors Association and the Sacramento Regional Fire Technology Advisory Board. The program offers both an intensive training course culminating in a Certificate of Achievement and an additional general education program leading to the Associate in Arts degree. Instructors in this program are experienced members of the fire service.

DIVISION DEAN [Steve Segura \(/about-us/faculty-and-staff-directory/steven-segura\)](/about-us/faculty-and-staff-directory/steven-segura)

 [Sacramento Regional Public Safety Training Center \(/academics/public-safety-training-center/arc-mcclellan-public-safety-center-office\)](/academics/public-safety-training-center/arc-mcclellan-public-safety-center-office)

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Associate Degree

A.A. in Fire Technology

This program focuses on preparing for a career in the fire service. It includes educational opportunities for those currently employed within the fire service and those within volunteer fire agencies. Courses include those required for transfer to four-year colleges, those required to meet eligibility requirements for employment, and those required for incentive salary increases.

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
FT 300	Fire Protection Organization	3
FT 301	Fire Prevention Technology	3
FT 302	Fire Protection Equipment and Systems	3
FT 303	Building Construction for Fire Protection	3
FT 304	Fire Behavior and Combustion	3
FT 305	Firefighter Safety and Survival	3
A minimum of 12 units from the following:		12
FT 110	Fire Apparatus (3)	
FT 130	Fire Company Organization and Management (3)	
FT 170	Fire Investigation (3)	
FT 180	Rescue Practices (3)	
FT 190	Fire Tactics and Strategy (3)	
FT 192	Wildland Fire Control (3)	
FT 310	Fire Service Hydraulics (3)	
FT 320	Hazardous Materials (3)	
Total Units:		30

The Fire Technology Associate in Arts (A.A.) degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- complete the duties of an entry level firefighter
- identify the fundamentals of the incident command system (ICS)
- compare and contrast the makeup of a moderate size fire department with a large fire department
- describe the components of firefighting personnel protective equipment (PPE)
- compare and contrast modern PPE with antiquated PPE
- analyze simulated fire situations for indicators of flashover versus backdraft potential and prescribe mitigation measures to prevent them from occurring
- assess the fundamentals of physical science as they relate to the fire services: measurements, energy and work theories, power and transfer of heat principles, the laws of matter and the conservation of energy, and the exothermic chemical reaction called combustion
- classify and compare various types of municipal water systems
- describe the fundamentals of building construction and apply this knowledge to fire situations where forcible entry and overhaul evolutions may weaken the already fire-weakened structure
- compare and contrast fire prevention versus fire suppression efforts
- draft a pre-fire plan
- evaluate and analyze the rate of fire spread in a structure fire
- explain the physical and chemical properties of fire
- describe how ICS is used by fire departments at emergencies
- compare and contrast the makeup of a fully paid department with a volunteer fire department

Career Information

Employment opportunities may be found in areas such as building inspection, fire investigation, fire prevention, hazardous materials specialist, public education, and firefighting.

Certificates of Achievement

Fire Technology Certificate

This program focuses on preparing for a career in the fire service. It includes educational opportunities for those currently employed within the fire service and those within volunteer fire agencies. Courses include those required for transfer to four-year colleges, those required to meet eligibility requirements for employment, and those required for incentive salary increases.

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
FT 300	Fire Protection Organization	3
FT 301	Fire Prevention Technology	3

COURSE CODE	COURSE TITLE	UNITS
FT 302	Fire Protection Equipment and Systems	3
FT 303	Building Construction for Fire Protection	3
FT 304	Fire Behavior and Combustion	3
FT 305	Firefighter Safety and Survival	3
A minimum of 12 units from the following:		12
FT 110	Fire Apparatus (3)	
FT 130	Fire Company Organization and Management (3)	
FT 170	Fire Investigation (3)	
FT 180	Rescue Practices (3)	
FT 190	Fire Tactics and Strategy (3)	
FT 192	Wildland Fire Control (3)	
FT 310	Fire Service Hydraulics (3)	
FT 320	Hazardous Materials (3)	
Total Units:		30

Student Learning Outcomes

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- classify and compare various types of municipal water systems
- describe the fundamentals of building construction and apply this knowledge to fire situations where forcible entry and overhaul evolutions may weaken the already fire-weakened structure
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- compare and contrast the makeup of a fully paid department with a volunteer fire department

Gainful Employment

The US Department of Education requires colleges to disclose a variety of information for any program that is eligible for financial aid that "prepares students for gainful employment in a recognized occupation." The following link provides Gainful Employment Disclosure information for this certificate program:

[Gainful Employment Information for Fire Technology Certificate of Achievement \(https://web.losrios.edu/gainful-emp-info/arc/30461/30461.htm\)](https://web.losrios.edu/gainful-emp-info/arc/30461/30461.htm)

Career Information

Employment opportunities may be found in areas such as building inspection, fire investigation, fire prevention, hazardous materials specialist, public education, and firefighting.

Firefighter Recruit Academy Certificate

This program provides the knowledge necessary to assume the role of firefighter with the ability to work effectively and safely with the fire environment as well as within a company in the fire department in all functions of that company. Topics include indoctrination into the fire service, general maintenance, apparatus and equipment operations, fire control, wildland firefighting, emergency vehicle operations, salvage, fire prevention and public education, fire and arson investigation, rapid intervention crew tactics, vehicle extrication, physical fitness/wellness, emergency care, and forcible entry.

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
FIRE 1500	Firefighter Academy	14 -15
Total Units:		14 - 15

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- identify and describe the history, development, structure, organization and responsibility of the Fire Service
- define, identify and apply the components and principles of the Incident Command System
- explain the core values of the fire service and its duty of providing service delivery to the public
- perform preventative maintenance to fire station, apparatus and equipment
- demonstrate the use of fire department apparatus and tools within the scope of assignment
- explain and apply the basic concept of fire control, fire and arson investigation and fire communication systems
- identify and demonstrate basic skills in public education procedures and instruction
- interpret work place rules and laws regarding harassment/discrimination policies and mandated reporting procedures
- relate to wellness programs, stress management and approved academy physical fitness programs
- identify and demonstrate first responder responsibilities for handling medical emergencies
- identify first responder responsibilities for mitigation of hazardous material incidents
- choose safe driving procedures for emergency response vehicles
- apply principles of vehicle extraction
- apply fire suppression tactics and strategies
- interpret wild land fire behavior, suppression techniques and safety measures
- demonstrate firefighter rescue and survival skills

Certificates

Fire Investigation 1A Certificate

This program provides participants with an introduction and basic overview of fire scene investigation. The focus of this course is to provide information in determining the area of fire origin in fires involving vehicles, structures, and wildland. Accidental and criminal fire causes are discussed in detail.

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
FIRE 1670	Fire Investigation 1A, Fire Cause and Origin Determination (2)	2
Total Units:		2

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- distinguish the four different methods of heat transfer and compare their effects during a fire's progression
- choose the correct California Arson Law section when applying it to a factual situation
- recognize the elements necessary for the ignition and the sustained combustion of fuel and heat
- explain the elements required for an electrically caused fire to occur
- identify common scene indicators of arson and apply it to a factual situation
- describe the methodology required for a proper and thorough investigation of a structure, vehicle, and wildland fire
- differentiate between the different types of explosions and their unique effects

Fire Investigation 1B Certificate

This program expands on specific topics encountered by the fire investigator. These topics include detailed information on motives of fire setters; conducting a post blast scene; the investigation of a fire death; the recognition, collection, and preservation of evidence; interviewing and interrogation of witnesses and suspects; and the effect of a building's construction on the spread of fire.

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
FIRE 1671	Fire Investigation 1B, Techniques of Fire Investigation	2
Total Units:		2

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- differentiate between the six common motives associated with fire setters
- examine a fire scene appraising the different safety hazards associated with an investigation
- compare a fire scene investigation versus a post blast scene investigation

- examine a fire scene to determine the appropriate evidence to support a fire cause
- compare factures associated with an interview and an interrogation
- appraise a fire death scene to determine if a criminal act has occurred
- organize their case investigations utilizing proper case reports, resources, and insurance information

Fire Investigation 2A Certificate

This program provides information on how to investigate, apprehend, and convict arsonists. It focuses heavily on legal case preparation. Topics include interviewing and interrogating suspects, search and seizure, warrants, courtroom demeanor, and working with the district attorney's office.

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
FIRE 1672	Fire Investigation 2A	2
Total Units:		2

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- differentiate among the three effects of an explosion
- validate an arson corpus after examining a practical fire scene
- appraise an explosion scene to determine if a criminal act has occurred
- organize a fire investigation utilizing case reports, court exhibits, and testimony
- differentiate between the U.S. Supreme Court's finding and California's Supreme Court's requirements in preparing a search warrant
- recognize the elements necessary for the ignition and the sustained combustion of fuel and heat in a practical situation
- describe the methodology and procedure required for a proper surveillance operation

Fire Investigation 2B Certificate

This program provides advanced instruction in fire scene investigation, case preparation, and courtroom presentation. Topics include reviewing fire scene photography, sketching, evidence collection, interviewing and interrogation, and extensive use of simulations for developing and presenting an arson case in court.

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
FIRE 1673	Fire Investigation 2B	2
Total Units:		2

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- demonstrate the proper procedure of qualifying as an expert witness in fire origin and cause

- structure interview questions with witnesses and suspects in accordance with federal and state law requirements
- identify common scene indicators of arson and apply it to a practical situation
- examine a fire scene to determine the appropriate evidence needed to support a criminal fire cause
- verify an arson corpus after examining a criminal fire scene

USDA Advanced Academy Certificate

This program is designed to provide the skills and knowledge necessary to perform as a team leader. Topics include leadership, fuels management, fire behavior, basic air operations, firing equipment and techniques, and fireline fatalities. This course is presented in a formal academy setting.

Certificate Requirements

USDA Basic Academy Certificate

This course is designed to provide the skills and knowledge necessary to perform as a skilled Wildland Firefighter. Topics include physical fitness, wellness, nutrition, first responder medical, fire prevention, maps, compass, fire line construction, hand tool use, communications, leadership, and firefighter skills. The academy is presented in a formal setting.

Certificate Requirements

Fire Technology (FT)

FT 110 Fire Apparatus

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.

This course covers various aspects of fire apparatus. Topics include design, typing, specifications, construction, performance capabilities, and maintenance. It also includes warning devices and the utilization of apparatus in fire service emergencies.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- discuss fire apparatus history, typing, design, specifications, and construction
- describe the operation of various fire apparatus and specialized equipment
- analyze the difficulties of maintaining fire apparatus

FT 130 Fire Company Organization and Management

Units:	3
Hours:	54 hours LEC

Prerequisite:

None.

Advisory:

Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.

This course explores the organization and management of a fire department and the relationship of government agencies to the fire service. It emphasizes fire service leadership from the perspective of the company officer. Topics include ethical conduct, challenges of supervision, organizational structure, communication, human resource management functions, and administrative functions.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- compare and contrast leadership versus management within a fire organization
- discuss the leader's role and responsibilities within a fire organization
- explain the different types of fire department organizations
- identify and describe the general functions of management within a fire organization
- describe the use of the incident management system for responses involving one or more units
- describe the need for research and development at the company level

FT 170 Fire Investigation

Units:

3

Hours:

54 hours LEC

Prerequisite:

None.

Advisory:

Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.

This course introduces the general practices involved in fire investigation. Topics include determining the cause of fires (accidental, suspicious, and incendiary); types of fires; related laws; introduction to incendiary fires; motives for starting fires; recognizing and preserving evidence; interviewing witnesses and suspects; and arrest, detention, and court procedures.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- describe how to recognize, protect, and preserve evidence of fire cause
- explain the techniques relating to court procedures
- explain the techniques for interviewing witnesses and suspects
- diagnose the point of origin at a fire scene
- describe the scientific method of fire investigation

FT 180 Rescue Practices

Units:

3

Hours:

54 hours LEC

Prerequisite:

None.

Advisory:

Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.

This course focuses on the identification and management of rescue situations, such as proper utilization and awareness of equipment, tools, and

techniques to handle various rescue situations. Topics include vehicle extrication, water rescue, vertical rescue, building collapse, radiation hazards, hazardous materials rescue, fire situations including rapid intervention awareness, and other emergency situations.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- describe techniques for dealing with various rescue situations
- set up emergency rescue equipment
- describe confined space rescue operations
- improvise treatments for common medical injuries, using minimal equipment

FT 190 Fire Tactics and Strategy

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.

This course is a basic requirement for all fire suppression personnel. Topics include the principles of fire control, utilization of staffing, equipment and placement, extinguishing agents, and fire control methods on the fireground.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- discuss the historical changes in fire service tactics and strategy
- assess the differences in fire extinguishing agents and apply the most effective methods to the situation
- estimate the staffing structure and equipment needs at an emergency utilizing the Incident Command System (ICS)
- calculate the best method for extinguishing the fire on the fireground
- recognize the divisions of fire tactics and strategy
- explain the role of each fire tactics and strategy division
- apply salvage and overhaul procedures at an emergency
- categorize fireground tactics and strategies used in urban and wildland emergency situations

FT 192 Wildland Fire Control

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.

This course covers all aspects of wildland fire fighting and introduces advances in technology for wildland fire suppression. Topics include fire behavior,

weather conditions, topography factors, safety, prevention, extinguishing methods, initial attack, Incident Command System (ICS), communications, aircraft assistances, hand crews, and bulldozer operation.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- assess wildland fire behavior as it relates to weather, fuel, and topography
- illustrate the wildland fire threat in California
- describe firefighters' safety as it relates to wildland fire fighting
- demonstrate the methods used to bring wildland fires under control

FT 295 Independent Studies in Fire Technology

Units:	1 - 3
Prerequisite:	None.

FT 298 Work Experience in Fire Technology

Units:	1 - 4
Hours:	75 - 300 hours LAB
Prerequisite:	None.
Enrollment Limitation:	Indentured in the Wildland Firefighter Apprenticeship Program (W.F.A.P.).

This course provides students the opportunity to work in the Wildland Firefighter Apprenticeship Program (W.F.A.P.) for the purpose of developing specific skills to meet the goals and objectives of the National Interagency Joint Apprenticeship Committee (N.I.J.A.C.). Students complete work experience hours at approved training sites. Students may take up to 16 units total across all Work Experience course offerings. This course may be repeated when there are new or expanded learning objectives. Only one Work Experience course may be taken per semester. One unit of credit is earned for each 60 hours of unpaid, or 75 hours of paid work.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- demonstrate competencies for effective and competitive workforce performance in the Wildland Firefighter Apprenticeship Program (W.F.A.P.)
- demonstrate mastery of specific job skills as written in learning objectives under the supervision of the National Interagency Joint Apprenticeship Committee (N.I.J.A.C.)

FT 300 Fire Protection Organization

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340
Transferable:	CSU
C-ID:	C-ID FIRE 100X

This course provides an introduction to fire protection, its career opportunities, and related fire service fields. Topics include philosophy and history of fire

protection, fire loss analysis, organization and function of public and private fire protection services, fire departments as part of local government, as well as laws and regulations affecting the fire service. Additionally, fire service nomenclature, specific fire protection functions, basic fire chemistry and physics, introduction to fire protection systems, and introduction to fire strategy and tactics, are covered.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- illustrate and explain the history and culture of the fire service
- analyze the basic components of fire as a chemical chain reaction and the major phases of fire
- differentiate between fire service training and education, and explain the value of higher education to the professionalization of the fire service
- list and describe the major organizations that provide emergency response service and illustrate how they interrelate
- discuss and describe the scope, purpose, and organizational structure of fire and emergency services
- describe the common types of fire and emergency service facilities, equipment, and apparatus
- compare and contrast effective management concepts for various emergency situations
- identify the primary responsibilities of fire prevention personnel including: code enforcement, public information, and public and private protection systems
- describe the importance of wellness and fitness as it relates to emergency services
- examine the main factors that influence fire spread and fire behavior

FT 301 Fire Prevention Technology

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.
Transferable:	CSU
C-ID:	C-ID FIRE 110X

This course provides fundamental knowledge relating to the field of fire prevention. Topics include history and philosophy of fire prevention, organization and operation of a fire prevention bureau, use and application of codes and standards, plans review, fire inspections, fire and life safety education, and fire investigation.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- define the national fire problem and the role of fire prevention.
- identify and describe fire prevention organizations and associations.
- define laws, authority have jurisdiction (AHJ), regulations, and fire codes.
- define the functions of a fire prevention bureau.
- describe inspection practices and procedures.
- identify and describe the standards for professional qualification for fire marshal, plans examiner, fire inspector, fire and life safety educator, and fire investigator.

- list opportunities in professional development for fire prevention personnel.
- describe the history and philosophy of fire prevention.

FT 302 Fire Protection Equipment and Systems

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.
Transferable:	CSU

This course provides information relating to sprinkler design and the operation of fire detection and alarm systems. Topics include fire cause and effect, heat and smoke control systems, sprinkler systems, water supply for fire protection, standpipe systems, and portable fire extinguishers.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- compare smoke and fire movement in various types of construction and the relationship to systems and equipment
- identify organizations that provide information or service to fire protection systems
- compare types, classifications, and effectiveness ratings of fire extinguishers
- classify distribution, installation, and test requirements for fire extinguishers
- define types, components, and operation of fire protection systems and equipment for special hazards
- identify water supply requirements, distribution systems, and testing for public and private fire protection
- classify types, components, and operation of automatic and special sprinkler systems
- choose types of standpipe systems and water supply requirements
- compare detection, alarm, and supervisory devices and systems
- compare heat and smoke control devices and hardware

FT 303 Building Construction for Fire Protection

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.
Transferable:	CSU

This course covers the components of building construction that relate to fire safety. Specific focus is on elements of construction and the design of structures that are shown to be key factors regarding inspecting of buildings, pre-planning fire operations, and emergency operations at fires. Topics include principles of fire and smoke growth, fire resistance construction, as well as wood, ordinary, steel, and concrete construction.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- classify safety concerns presented by the following loads: wind, snow, dead, live, fire, and impact
- evaluate fire stability for the following structural members: column, wall, arch, beam, and truss
- describe key factors in the fire performance of three common floors and four ceilings found in wood and ordinary construction
- choose the key features of a wood frame building and their implications for fire stability
- analyze ordinary construction and cite factors in fire stability and fire spread
- list indicators of collapse in ordinary construction
- cite the possible fire hazards in various types of construction
- choose key factors that may be expected to lessen or increase the resistance of steel to stress and fire
- choose key factors that increase or lessen concrete's resistance to stress and fire
- evaluate the probable impact of the following factors on smoke spread within buildings: buoyancy, expansion, stack effect, wind, Heating Ventilating Air Conditioning (HVAC), smoke control systems, fire protection systems, and detection systems
- define features that may adversely affect the safety of emergency operations in buildings under construction
- describe the history of fire resistance construction and its changes through the years

FT 304 Fire Behavior and Combustion

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.
Transferable:	CSU
General Education:	AA/AS Area IV

This course covers the theories and fundamentals of how and why fires start and spread, and how they are controlled. Topics include an in-depth study of fire chemistry and physics, fire characteristics of materials, extinguishing agents, and fire control techniques.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- classify the basic laws differentiating matter and energy
- compile basic terminology, definitions, and terms associated with basic fire chemistry
- compose some of the basic chemical symbols used in chemical formula writing
- identify physical properties in the three states of matter
- describe the Department of Transportation (DOT) warning placards and labeling systems
- identify the components of fire
- describe the various methods and techniques of fire extinguishing
- list the physical and chemical properties of fire
- differentiate and explain the phenomena of fire chemistry and behavior

FT 305 Firefighter Safety and Survival

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.
Transferable:	CSU

This course introduces the principles and history related to the national firefighter life safety initiatives, focusing on the need for cultural and behavioral changes throughout the emergency services profession. It emphasizes occupational health and safety of firefighters as well as their personal and organizational accountability. Topics include safety, risk management, medical and fitness standards, industry standards relating to vehicle operation and road scene safety, as well as firefighter fatality case studies and analysis. This course emphasizes best safety practices before, during, and after the emergency incident.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- describe the risk management process and the operational influence of “after action reviews” on safety
- explain the need for annual medical evaluations and the establishment of physical fitness criteria for emergency services personnel throughout their careers
- analyze case studies of emergency scene firefighter fatalities to determine, through examination of cause and effect, how to prevent such incidents in the future
- explain how technological advancements, training standards, and investigation of accidents and “near misses” can produce a higher level of firefighter safety and survival

FT 310 Fire Service Hydraulics

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	MATH 32 or MATH 42; AND eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.
Transferable:	CSU

This course covers the theory of water hydraulics, hydraulic distribution systems, hydraulic practices, and extinguishing agents used with fire service hydraulics. Topics include the properties of water at rest and in motion, water velocity and discharge, distribution systems, fire service pumps, friction loss calculations, engine and nozzle pressures, and fire streams. This course also focuses on standpipe systems, automatic sprinkler systems, and foam systems.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- summarize the components related to water supply in fire service hydraulics.
- explain the properties of water at rest and in motion, velocity, and discharge.
- describe how water is discharged from a fire apparatus.
- explain the operational procedures of fire service pumps and their control devices.
- calculate the friction loss of water within a hydraulic system.

FT 320 Hazardous Materials

Units:	3
Hours:	54 hours LEC
Prerequisite:	None.
Advisory:	Eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.
Transferable:	CSU

This course is an introduction to hazardous materials, including physical properties, uses in industry, and characteristics when involved in spills, fires, and accidents. It covers emergency procedures, legal requirements, and compliance with regulations. Topics include flammable and combustible liquids, flammable and non-flammable compressed gases, flammable solids and combustible metals, oxidizing agents, poison gases and liquids, radioactive substances, and corrosive materials.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- describe the various Department of Transportation (DOT) hazard classes
- describe the Department of Transportation's placarding and labeling system
- identify the basic physical properties and burning characteristics of the various classes of hazardous materials
- explain the need for scene isolation, scene stabilization, and incident control
- identify various acceptable methods of incident control measures depending upon the dangers of the chemicals
- analyze the health dangers and symptoms of chemical classes
- compare the safety considerations encumbered by the fire department to ensure compliance with state and federal guidelines

FT 495 Independent Studies in Fire Technology

Units:	1 - 3
Prerequisite:	None.
Transferable:	CSU

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