Fire Technology

Overview

The fire service is one of the most dynamic employers in the country. This CRC program is designed to provide the student with updated skills and knowledge necessary to complete and successfully apply for fire service positions. The curriculum serves as an inservice program as well as a pre-employment program for students seeking employment or advancement in the profession of urban fire fighting and fire suppression.

Program Maps

Fire Technology, A.S. Degree
Fire Technology, Firefighter Suppression Specialist, Certificate of Achievement
Fire Technology, Fire Prevention, A.S. Degree

Associate Degrees

A.S. in Fire Prevention

The fire service is one of the most dynamic employers in the country. This CRC program is designed to provide the student with updated skills and knowledge necessary to complete and successfully apply for fire service positions. The curriculum serves as an in-service program as well as a pre-employment program for students seeking employment or advancement in the profession of fire prevention.

Catalog Date: June 1, 2020
Degree Requirements

<table>
<thead>
<tr>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>UNITS</th>
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</thead>
<tbody>
<tr>
<td>FT 300</td>
<td>Fire Protection Organization</td>
<td>3</td>
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<tr>
<td>FT 301</td>
<td>Fire Prevention Technology</td>
<td>3</td>
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<tr>
<td>FT 302</td>
<td>Fire Protection Equipment and Systems</td>
<td>3</td>
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<tr>
<td>FT 303</td>
<td>Building Construction for Fire Protection</td>
<td>3</td>
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<tr>
<td>FT 304</td>
<td>Fire Behavior and Combustion</td>
<td>3</td>
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<tr>
<td>FT 498</td>
<td>Work Experience in Fire Technology</td>
<td>1 - 4</td>
</tr>
</tbody>
</table>

A minimum of 9 units from the following:

<table>
<thead>
<tr>
<th>COURSE CODE</th>
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</thead>
<tbody>
<tr>
<td>BIT 100</td>
<td>Introduction to the International Building Code (3)</td>
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<tr>
<td>BIT 102</td>
<td>Plan Reading and Non-Structural Plan Review (3)</td>
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<tr>
<td>BIT 104</td>
<td>International Building Code - Fire &amp; Life Safety (3)</td>
<td></td>
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<tr>
<td>BIT 130</td>
<td>Introduction to Inspection of Wood Frame Construction (3)</td>
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</table>

Total Units: 25 - 28

The student must have 1-4 units of work experience in Fire Prevention to receive a degree.

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

Student Learning Outcomes

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

- PSLO #1: Comprehend the qualifications for entry level skills, the discipline and evaluation process, fire service structure, history, and culture for the field of fire prevention.
- PSLO #2: Identify and comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire prevention operations.
- PSLO #3: Analyze and determine the causes of fire, extinguishing agents, stages of fire, fire development, and methods of heat transfer.
- PSLO #4: Identify and describe the common types of building construction and conditions associated with structural collapse.
- PSLO #5: Differentiate between fire detection and fire suppression systems.

Career Information

Fire Inspector, Fire Investigator, Plans Examiner, Building Inspector, Fire Prevention Specialist/Officer, Public Education Specialist/Officer, Manager, Firefighter Some Career Opportunities may require more than two years of college study. Classes beyond the associate degree may be required to fulfill some career opportunities for preparation for transfer to a university program.

A.S. in Fire Technology

The fire service is one of the most dynamic employers in the country. This CRC program is designed to provide the student with updated skills and knowledge necessary to complete and successfully apply for fire service positions. The curriculum serves as an inservice program as well as a pre-employment program for students seeking employment or advancement in the profession of urban fire fighting and fire suppression.

HIGHLIGHTS

* Up-to-date technical information
* Field trips to a variety of fire service locations
* Networking with other fire service members
* Fire Technology work experience internships (Fire Technology 498 for on-the-job experience)

NOTE TO TRANSFER STUDENTS: If you are interested in transferring to a four-year college or university to pursue a bachelor's degree in this major, it is critical that you meet with a CRC counselor to select and plan the courses for your major. Schools vary widely in terms of the required preparation. The courses that CRC requires for an Associate's degree in this major may be different from the requirements needed for the Bachelor's degree.

Catalog Date: June 1, 2020

Degree Requirements
A minimum of 9 units from the following:

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<tbody>
<tr>
<td>FT 110</td>
<td>Fire Apparatus (3)</td>
<td></td>
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<tr>
<td>FT 130</td>
<td>Fire Company Organization and Management (3)</td>
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<tr>
<td>FT 170</td>
<td>Fire Investigation (3)</td>
<td></td>
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<tr>
<td>FT 180</td>
<td>Rescue Practices (3)</td>
<td></td>
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<tr>
<td>FT 190</td>
<td>Fire Tactics and Strategy (3)</td>
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<tr>
<td>FT 210</td>
<td>Firefighter Academy for the Internship Program (7.5)</td>
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</tbody>
</table>

Total Units: 9

A current California EMT certificate or Paramedic license will be accepted as satisfactory completion of the EMT 100 requirement.

The student must have 1-4 units of work experience in Firefighting or Emergency Medical Services to receive a degree.

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

Student Learning Outcomes

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

- PSLO #1: Comprehend the qualifications for entry level skills, the discipline and evaluation process, fire service structure, history, and culture for the field of fire technology.
- Analyze, appraise, and evaluate fire incidents and components of emergency management and firefighter safety.
- PSLO #2: Comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire department operations.
- PSLO #3: Analyze and determine the causes of fire, extinguishing agents, stages of fire, fire development, and methods of heat transfer.
- Synthesize and determine the appropriate use and flow requirement of hydraulic fire apparatus.
- Describe the appropriate uses and maintenance for apparatus and equipment used in the fire service.
- PSLO #4: Evaluate the common types of building construction and conditions associated with structural collapse and firefighter safety.
- Evaluate fire detection and fire suppression systems.

Career Information

Firefighter; Inspector; Investigator; Supervisor; Manager Some career options may require more than two years of college study. Classes beyond the associate degree may be required to fulfill some career options or for preparation for transfer to a university program.

Certificate of Achievement

Firefighter Suppression Specialist Certificate

The fire service is one of the most dynamic employers in the country. This CRC program is designed to provide students with updated skills and knowledge necessary to complete and successfully apply for fire service positions. The purpose of the Fire Suppression Specialist Certificate is to recognize, through certification, qualified individuals who are dedicated to curtailing fire loss, both physical and financial, and who have acquired a level of professionalism through applied work experiences and related education opportunities, and through successful completion of a certification examination.

The curriculum serves as an in-service program as well as a pre-employment program for students seeking employment or advancement in the profession of urban fire fighting, fire prevention, and public and private fire suppression.

HIGHLIGHTS

* Up-to-date technical information
* Field trips to a variety of fire service locations
* Networking with other fire service members
* Fire Technology work experience internships
  (Fire Technology 498 for on-the-job experience)

Catalog Date: June 1, 2020

Certificate Requirements

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<tr>
<td>FT 300</td>
<td>Fire Protection Organization</td>
<td>3</td>
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<tr>
<td>EMT 100</td>
<td>Emergency Medical Technician</td>
<td>7.51</td>
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<tr>
<td>FT 210</td>
<td>Firefighter Academy for the Internship Program</td>
<td>7.5</td>
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<tr>
<td>FT 320</td>
<td>Hazardous Materials</td>
<td>3</td>
</tr>
<tr>
<td>FT 498</td>
<td>Work Experience in Fire Technology (1 - 4)</td>
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A minimum of 16 units from the following:

Total Units: 37

1 A current California EMT certificate or Paramedic license will be accepted as satisfactory completion of the EMT 100 requirement.

2 Students should take 4 units of Fire Technology Work Experience (FT 498) each semester for 4 semesters, earning a total of 16 units of work experience through FT 498.
Student Learning Outcomes

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

- PSLO 1: Comprehend the qualifications for entry level skills, the discipline and evaluation process, fire service structure, history, and culture for the field of fire technology.
- PSLO 2: Analyze, appraise, and evaluate fire incidents and components of emergency management and firefighter safety.
- Comprehend laws, regulations, codes, standards, and the regulatory and advisory organizations that influence fire department operations.
- PSLO 3: Develop policies, procedures, and training programs to inform and educate population in fire prevention principles and fire and life safety practices; understand proper design, installation, and maintenance of electrical systems and appliances while identifying the components that, alone or in combination, form emergency and standby power systems; analyze the dynamics of heating systems; identify basic components of and the hazards associated with ‘hot work’ and the manufacturing processes necessary for effective fire prevention.
- PSLO 4: Analyze facility fire hazard management to include capturing knowledge of property fire insurance, building construction and/or field experience; performing fire/property surveys involving detailed analyses; observation, examination, inspection, and gathering of data to describe all aspects of a property/building and business; conducting complex inspection surveys of commercial and residential properties to evaluate physical characteristics of a property and business.
- PSLO 5: Recognize system approaches to property classes; assessing life safety as it relates to fire protection in special occupancies and understanding fire protection in warehouse and storage operations.
- Evaluate fire detection and fire suppression systems.
- PSLO 6: Define organizations for fire and rescue services; perform pre-incident planning for industrial and commercial facilities, interpret operations of fire loss prevention and emergency organizations, understand operations of emergency medical services, describe municipal fire prevention and code enforcement operations; train fire and emergency services; understand the use and function of fire and emergency services protective clothing and protective equipment; and evaluate fire department resources and the placement thereof.

Career Information

Firefighter; Fire Inspector; Investigator; Supervisor; Manager, Plans Examiner; Building Inspector; Fire Prevention Specialist/Officer; Public Education Specialist/Officer

Fire Technology (FT) Courses

FT 110 Fire Apparatus

| Units: | 3 |
| Hours: | 54 hours LEC |
| Prerequisite: | None. |
| Advisory: | FT 130; FT 300; or employment as a firefighter |
| Catalog Date: | June 1, 2020 |

This course covers various aspects of fire apparatus. Topics include design, typing, specifications, construction, performance capabilities, and maintenance. This course includes principles and techniques for maintaining and operating fire service pumping and other mobile apparatus. The course includes fire service equipment and apparatus troubleshooting; principles and techniques of preventive maintenance; construction and operation of fire service pumps and pump accessories; basic highway operating techniques for fire apparatus; fire apparatus specifications and testing procedures. Also included are warning devices and the utilization of apparatus in fire service emergencies. Effective utilization of equipment on the fireground will be the focus with emphasis on practical applications.

Student Learning Outcomes

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

- SLO 1: Analyze, appraise, and evaluate fire incidents and components of emergency management and firefighter safety.
- analyze fire case study scenarios and formulate solutions.
- SLO 2: Synthesize and determine the appropriate use and flow requirement of hydraulic fire apparatus.
- list and explain the principles of pumping operations.
- SLO 3: Describe the appropriate uses and maintenance for apparatus and equipment used in the fire service.
- compare and contrast the design characteristics of aerial ladder trucks.
- describe operating principles of fully-hydraulic aerial, hydro-mechanical aerial, and manual-emergency operational procedures.
- explain the types of fire ground scenarios in which elevating platform apparatus would be used.
- describe types of platform apparatus; explain their comparative use under different kinds of conditions.
- analyze the hazards associated with the use of fire apparatus under emergency conditions.
- describe the use of specialized equipment such as fireboats, airport apparatus, etc.
- describe the components and the importance of systems checks for the maintenance of fire apparatus.
- prepare apparatus inspection records.
- describe safety procedures and records to be kept for safe use of all fire apparatus.

FT 130 Fire Company Organization and Management

| Units: | 3 |
| Hours: | 54 hours LEC |
| Prerequisite: | Company Officer is the preferred prerequisite, however, the minimum qualifications of Firefighter II in accordance with the State of California Office of the Fire Marshal may be accepted at the discretion of the instructor as this course meets Company Officer 2A instruction. |
| Advisory: | FT 300 or employment as a firefighter. |
An in-depth review of the operation, organization and planning concepts of today's fire departments. Emphasizes the functions of management including budgeting, time management, delegation, motivation, and discipline. Explores concepts of continuous improvement, team-building, and principles of quality management, relative to fire service operations.

**Student Learning Outcomes**

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

- SLO 1: Comprehend the qualifications for entry level skills, the discipline and evaluation process, fire service structure, history, and culture for the field of fire technology.
- describe a fire department's organizational structure.
- analyze the relationships between and among segments of fire departments.
- describe methods of departmental communications.
- identify and describe the general functions of management.
- compare various management styles and examine style outcomes and results.
- describe the system of progressive discipline.
- develop work flow plans.
- explain the importance and procedure of evaluations.
- compare and contract team-building strategies and explain the importance of team functions in the fire department.
- describe the company's role in coordinating with other public/private agencies.
- SLO 2: Comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire department operations.
- analyze the role of the company in area-wide emergencies.
- describe the roles and responsibilities of the fire department in routine inspections.
- describe proper care of department property and records.
- compare and contrast methods for determining station location.
- determine manning requirements, based on ISO and local factors.

**FT 170 Fire Investigation**

- **Units:** 3
- **Hours:** 54 hours LEC
- **Prerequisite:** None.
- **Advisory:** FT 300 or employment as a firefighter

This course focuses on determining causes of fires (accidental, suspicious and incendiary), the types of fires, related laws, an introduction to arson and incendiarism, recognizing and preserving evidence, the interviewing of witnesses and suspects, arrest and detention procedures, court procedures and giving court testimony.

**Student Learning Outcomes**

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

- SLO 1: Comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire department operations.
- describe the proper arrest and detention procedures for adults and juveniles.
- SLO 2: Analyze and determine the causes of fire, extinguishing agents, states of fire, fire development, and method of heat transfer.
- diagnose the point of origin at a fire scene
- recognize, protect, and preserve evidence of fire cause; in proper techniques relating to court testimony; in proper techniques for interviewing witnesses and suspects; in laws relating to fire investigation.
- relate the responsibilities of determining the cause of fire to fire and police personnel.
- describe the scientific method of fire investigation

**FT 180 Rescue Practices**

- **Units:** 3
- **Hours:** 54 hours LEC
- **Prerequisite:** None.
- **Advisory:** FT 300 or employment as a firefighter

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:

- SLO 1: Analyze, appraise, and evaluate fire incidents and components of emergency management and fire fighter safety.
- develop an overall understanding of emergency rescue technicians.
FT 190 Fire Tactics and Strategy

Student Learning Outcomes

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

- SLO 1: Comprehend the qualifications for entry level skills, the discipline and evaluation process, fire service structure, history, and culture for the field of fire technology.
- SLO 2: Comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire department operations.
- SLO 3: Identify next steps towards receiving technical rescue certifications applicable toward firefighter career enhancement and advanced mobility.
- SLO 4: Analyze and determine the causes of fire, extinguishing agents, stages of fire, fire development, and methods of heat transfer.
- SLO 5: Synthesize and determine the appropriate use and flow requirement of hydraulic fire apparatus.
- SLO 6: Describe the appropriate uses and maintenance for apparatus and equipment used in the fire service.
- SLO 7: Evaluate the common types of building construction and conditions associated with structural collapse and firefighter safety.
- SLO 8: Discuss the four variable factors that may affect basic positioning of apparatus in an emergency.
- SLO 9: Evaluate the risks associated with discovering remodeled work done without appropriate local permitting.
- SLO 10: Identify the roles of the National Incident Management System (NIMS) and Incident Management System (ICS) as it relates to strategy and tactics.
- SLO 11: Demonstrate the various roles and responsibilities in ICS/NIMS.

FT 210 Firefighter Academy for the Internship Program

This course provides the study of fundamental principles of fire tactics and strategy under ground conditions and procedures for effective development and application of pre-fire plans. Fire emergency problems are critically analyzed and definitive coping strategies are examined as it relates to staffing resources, equipment and extinguishing agents available during the emergency incident. This course meets the National Fire Academy, Fire and Emergency Services Higher Education (FESHE) curriculum model for the Strategy and Tactics Course. This course is also aligned with the State of California Fire Marshal "All Risk Command for Company Officers" (2D) certification track series.
FT 210 is a Firefighter Academy to provide the techniques and skills to work effectively and safely within the fire environment as well as in the fire department. This Firefighter Academy is CSD Fire Department's Academy (NOT a State Certified Regional Fire Academy). Students that successfully complete this course along with the CSD/CRC Firefighter work experience program (FT 498) are allowed to apply for the State of California Fire Fighter I certification.

topics include indoctrination into the fire service, general maintenance, apparatus and equipment operations, fire control, salvage, fire prevention and public education, fire and arson investigation, rapid intervention crew tactics, physical fitness/wellness, emergency care, and forcible entry. Students may be charged a lab fee for personal protective equipment (PPE) in the use of and maintenance of structural firefighter turnouts and equipment in this course. Students will also be responsible for purchasing other equipment, liability insurance and uniforms. Pass/no pass only.

Student Learning Outcomes

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

- SLO #1: Understand the core values of the fire service and the duty to provide service to the public.
- Describe the history, development, structure, organization, and responsibility of the fire service.
- Demonstrate basic skills in public education procedures and instruction.
- Understand and performs preventative maintenance to fire station, apparatus, and equipment.
- Explain and apply the basic concept of fire control, fire and arson investigation, and fire communication systems.
- SLO #2: Understand and apply national standards to firefighting techniques and operations.
- Use fire department apparatus and tools within the scope of assignment.
- Identify and demonstrate first responder responsibilities for handling medical emergencies.
- Demonstrate firefighter rescue and survival skills.
- Demonstrate fire suppression tactics and strategies.
- SLO #3: Demonstrate professional values and standards for fire service personnel that the industry requires
- Apply workplace rules and laws regarding harassment/discrimination policies and mandated reporting procedures.
- Comprehend the need to maintain both physical and mental health fitness to work in the field of Fire Service.

FT 295 Independent Studies in Fire Technology

| Units: | 1 - 3 |
| Hours: | 54 - 162 hours LAB |
| Prerequisite: | None. |
| Catalog Date: | June 1, 2020 |

An independent studies project involves an individual student or small group of students in study, research, or activities beyond the scope of regularly offered courses. See the current catalog section of "Special Studies" for full details of Independent Studies.

Student Learning Outcomes

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

- SLO #1: Actively engage in intellectual inquiry beyond that required in order to pass a course of study (College Wide Learning Outcome – Area 4).
- Discuss and outline a proposal of study (that can be accomplished within one semester term) with a supervising instructor qualified within the discipline.
- Design an independent study (to be completed individually or by collaboration of a small group) to foster special knowledge, skills, and experience that are not available in any one regularly scheduled course.
- Use information resources to gather discipline-specific information.
- SLO #2: Utilize modes of analysis and critical thinking to apply theoretical perspectives and/or concepts in the major discipline of study to significant problems and/or educational activities (College Wide Learning Outcome – Area 3).
- Analyze and apply the knowledge, skills and experience that are involved in the independent study to theoretical perspectives and/or concepts in the major discipline of study.
- Explain the importance of the major discipline of study in the broader picture of society.
- SLO #3: Communicate a complex understanding of content matter of the major discipline of study (College Wide Outcome – Area 3).
- Demonstrate competence in the skills essential to mastery of the major discipline of study that are necessary to accomplish the independent study.
- SLO #4: Identify personal goals and pursue these goals effectively (College Wide Outcome – Area 4).
- Utilize skills from the "academic tool kit" including time management, study skills, etc., to accomplish the independent study within one semester term.

FT 299 Experimental Offering in Fire Technology

| Units: | 0.5 - 4 |
| Prerequisite: | None. |
| Catalog Date: | June 1, 2020 |

FT 300 Fire Protection Organization

| Units: | 3 |
| Hours: | 54 hours LEC |
| Prerequisite: | None. |
| Transferable: | CSU |
| Catalog Date: | June 1, 2020 |
This course provides an introduction to fire protection and emergency services. Fire Protection Organization is recommended as the first course in the series of fire technology courses. Topics covered include: career opportunities in fire protection and related fields; culture and history of emergency services; 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; laws and regulations affecting the fire service; fire service nomenclature; specific fire protection functions; basic fire chemistry and physics; an introduction to fire protection systems; and an introduction to fire strategy and tactics; life safety initiatives. This course meets the National Fire Academy, Fire and Emergency Services Higher Education (FESHE) curriculum model for the Principles of Emergency Services.

Student Learning Outcomes

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

- SLO 1: Comprehend the qualifications for entry level skills, the discipline and evaluation process, fire service structure, history, and culture for the field of the fire service.
- analyze and describe the differences between the certificate, two-year, four-year degree programs and state certification.
- define the educational requirements, duties and information sources for various occupations in fire protection and explain the value of higher education to the professionalization of the fire service.
- SLO 2: Comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire department and emergency operations.
- list and describe the major organizations that provide emergency response service and illustrate how they interrelate.
- describe the effects of fire on the environment and the historical efforts made to protect society.
- identify the major organizations that contribute to fire protection.
- define and describe the scope, purpose, and organizational structure of fire and emergency services.
- identify the various codes, standards, ordinances and regulations that affect fire protection.
- identify the primary responsibilities of fire prevention personnel including, code enforcement, public information, and public and private protection systems.
- SLO 3: Analyze the basic components of fire; determine the causes of fire, extinguishing agents, stages of fire, fire development, and method of heat transfer.
- describe firefighting strategy and tactics.
- demonstrate the basic elements of firefighting safety and survival.
- SLO 4: Describe the common types of fire and emergency service facilities, equipment, and apparatus along with its appropriate uses and maintenance.
- summarize the basic components of fire as a chemical reaction, the major phases of fire and examine the main factors that influence fire spread and fire behavior.
- examine the types of common fire department apparatus, equipment and personal safety equipment used for firefighting.
- define the various applications of computers in the fire service.
- SLO 5: Define command structure utilized at all fire and emergency incidents.
- define the role of national, State and local support organizations in the fire and emergency services.
- compare and contrast effective management concepts for various emergency situations.
- SLO 6: Recognize the components of career preparation and goal setting.
- identify fire prevention and emergency-service careers in both the public and private sector.
- describe the importance of wellness and fitness as it relates to all fire and emergency services.
- demonstrate a working knowledge of basic culinary etiquette appropriate for shift work.

FT 301 Fire Prevention Technology

This course provides fundamental knowledge relating to the field of fire prevention, history and philosophy of fire prevention, organization and operation of a fire prevention bureau, use and application of codes and standards, plans review, fire inspection practices with identification and correction of fire hazards, fire and life safety education, and fire investigation. This course meets the National Fire Academy, Fire and Emergency Services Higher Education (FESHE) curriculum model for Fire Prevention.

Student Learning Outcomes

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

- SLO 1: Comprehend the qualifications for entry level skills, the discipline and evaluation process, fire service structure, history, philosophy of fire prevention.
- define the national fire problem and role of fire prevention, its origin and history within the United States.
- describe the importance of report preparation and records management in fire prevention efforts.
- define the role of national, State and local support organizations in the fire and emergency services.
- define all functions of a fire prevention bureau and explain the basic fire prevention functions of a fire department.
- SLO 2: Analyze, appraise, and evaluate fire incidents and components of emergency management and fire fighter safety.
- identify fire prevention organizations and associations.
- SLO 3: Comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire department operations.
- define laws, rules, regulations, and codes and identify those relevant to fire prevention of the authority having jurisdiction.
FT 302 Fire Protection Equipment and Systems

Student Learning Outcomes

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

- SLO 1: Comprehend laws, regulations, codes, standards, and the regulatory and advisory organizations that influence fire department operations at the national, state, and local level.
- identify and describe various types and uses of fire protection systems.
- explain the basic components of a fire alarm system.
- identify the different types of detectors and explain how they detect fire.
- discuss the appropriate application of fire protection systems.
- SLO 2: Evaluate the common types of building construction and conditions associated with structural collapse and firefighter safety.
- explain the benefits of fire protection systems in various types of structures.
- compare smoke and fire movements in various types of construction and the relationship to systems and equipment.
- SLO 3: Describe the basic elements of a public water supply system as it relates to fire protection, the basic elements including sources, distribution networks, piping and hydrants.
- synthesize and determine the appropriate use and flow requirement of hydraulic fire apparatus.
- calculate water supply requirements, distribution system and testing for public and private fire protection and explain why water is a commonly used extinguishing agent.
- identify the different types of non-water based fire suppression systems.
- analyze the application of hydraulic theory for fire protection.
- identify the different types and components of a sprinkler, standpipe, and foam systems.
- examine the components and operation of automatic and special sprinkler systems.
- examine the types of standpipe systems and water supply requirements.
- review residential and commercial sprinkler legislation.
- SLO 4: Describe the appropriate uses and maintenance for apparatus and equipment used in the fire service.
- explain the operation and appropriate application for the different types of portable fire protection systems.
- examine types, classifications, and effectiveness ratings of fire extinguishers.
- classify distribution, installation and test requirements for fire extinguishers.
- examine the types, components and operation of fire protection systems and equipment for special hazards.
- compare detection, alarm and supervisory devices and systems.
- compare heat and smoke control devices and hardware and describe the hazards of smoke.
- list the four factors that can influence smoke movement in a building.

FT 303 Building Construction for Fire Protection

Student Learning Outcomes

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

- SLO 1: Analyze, appraise, and evaluate fire incidents and components of emergency management and firefighter safety.
- analyze safety concerns presented by the following loads: designed, wind, snow, concentrated, distributed, dead, alive, fire, static, impact, suspended, axial, eccentric and torsional.
- apply consequences of fire exposure on compressive or tensile members composed of common building materials.
- SLO 2: Identify various classifications of building construction and understand theoretical concepts of how fire impacts major types of building construction.
- evaluate the common types of building construction and conditions associated with structural collapse and firefighter safety.
- evaluate fire stability for the following structural members: column, wall, arch, beam, truss.
- define the key factors in fire performance of three common floors and four ceilings commonly found in wood and ordinary construction.
- identify the key features of a wood frame building and their implications for fire stability.

This course meets the National Fire Academy, Fire and Emergency Services Higher Education (FESHE) curriculum model for Fire Protection Systems.
FT 304 Fire Behavior and Combustion

*Units:* 3  
*Hours:* 54 hours LEC  
*Prerequisite:* None.  
*Advisory:* FT 300 with a grade of “C” or better  
*Transferable:* CSU  
*Catalog Date:* June 1, 2020

This course provides the student with theories and fundamentals of how and why fires start, spread and are controlled; an in-depth study of fire chemistry and physics, fire characteristics of materials, extinguishing agents and fire control techniques. This course meets the National Fire Academy, Fire and Emergency Services Higher Education (FESHE) curriculum model for Fire Behavior and Combustion.

**Student Learning Outcomes**

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

- SLO 1: Analyze, appraise, and evaluate fire incidents and components of emergency management and firefighter safety.
- SLO 2: Comprehend laws, regulations, codes, standards and the regulatory and advisory organizations that influence fire department operations.
- SLO 3: Analyze and determine the causes of fire, extinguishing agents, stages of fire, fire development, and methods of heat transfer.
- SLO 4: Describe the appropriate uses and maintenance for apparatus and equipment used in the fire service.

FT 305 Firefighter Safety and Survival

*Units:* 3  
*Hours:* 54 hours LEC  
*Prerequisite:* None.  
*Advisory:* FT 300  
*Transferable:* CSU  
*Catalog Date:* June 1, 2020

The 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. Emphasis is placed on 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. The course emphasizes best safety practices before, during, and after the emergency incident. This course meets the National Fire Academy, Fire and Emergency Services Higher Education (FESHE) curriculum model for Principles of Fire and Emergency Services Safety and Survival.
Student Learning Outcomes

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

- SLO #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.
- explain the need for enhancements of personal and organizational accountability for health and safety.
- define how the concepts of risk management affect strategic and tactical decision-making.
- SLO #2: Describe and evaluate circumstances that might constitute an unsafe act.
- explain the concept of empowering all emergency services personnel to stop unsafe acts.
- SLO #3: Validate the need for annual medical evaluations and the establishment of physical fitness criteria for emergency services personnel throughout their careers.
- explain the role of local departments in national research and data collection systems.
- illustrate how technological advancements can produce higher levels of emergency services safety and survival.
- explain the importance of investigating all near-misses, injuries and fatalities.
- SLO #4: Discuss how incorporating the lessons learned from investigations can support cultural change throughout the emergency services.
- describe how obtaining grants can support safety and survival initiatives.
- formulate an awareness of how adopting standardized policies for responding to emergency scenes can minimize near-misses, injuries and deaths.
- SLO #5: Explain how the increase in violent incidents impacts safety for emergency services personnel when responding to emergency scenes.
- recognize the need for counseling and psychological support for emergency services personnel, their families, as well as, identify access to local resources and services.
- describe the importance of public education as a critical component of life safety programs.
- discuss the importance of fire sprinklers and code enforcement.
- explain the importance of safety in the design of apparatus and equipment.

FT 320 Hazardous Materials

| Units: | 3 |
| Hours: | 54 hours LEC |
| Prerequisite: | None. |
| Advisory: | FT 300, 301, 302, 303, and 304 |
| Transferable: | CSU |
| Catalog Date: | June 1, 2020 |

This course provides a study of the fire fighting practices related to hazardous chemicals, including their physical properties, uses in industry, and characteristics when involved in spills, fires, and accidents. Basic information regarding health effects and treatment, and fire department protocols and responsibilities.

Student Learning Outcomes

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

- SLO 1: Analyze, appraise, and evaluate fire incidents and components of emergency management and fire fighter safety.
- evaluate the various Dept. of Transportation Hazard classes.
- evaluate the United Nations Placarding and Labeling System.
- examine the basic physical properties and burning characteristics of the various classes of hazardous materials.
- SLO 2: Comprehend laws, regulations, codes, standards, and the regulatory and advisory organizations that influence fire department operations.
- compare the safety considerations encumbered by the fire department to ensure compliance with State and Federal guidelines.
- describe the legislature and legal authority controlling the actions of all activities conducted on scene by all agencies involved.
- SLO 3: Analyze and determine the causes of fire, extinguishing agents, stages of fire, fire development, and methods of heat transfer.
- explain the need for scene isolation, scene stabilization, and incident control.
- compare various acceptable methods of incident control measures depending upon the dangers of the chemicals.
- describe the importance of evacuation, noncommitment by the fire department, and total withdrawal procedures.
- analyze the effects of such modifying conditions as wind, temperature, and other weather and terrain-related factors in dealing with a hazardous material spill.
- explain the health dangers of chemical classes, and describe their resultant symptoms during physical human contact.
- SLO 4: Evaluate fire detection and fire suppression systems.
- analyze hazardous materials emergency case studies and develop management procedures and plans.

FT 495 Independent Studies in Fire Technology

| Units: | 1 - 3 |
| Hours: | 54 - 162 hours LAB |
| Prerequisite: | None. |
| Transferable: | CSU |
| Catalog Date: | June 1, 2020 |

An independent studies project involves an individual student or small group of students in study, research, or activities beyond the scope of regularly offered courses. See the current catalog section of "Special Studies" for full details of Independent Studies.

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

- SLO #1: Actively engage in intellectual inquiry beyond that required in order to pass a course of study (College Wide Learning Outcome – Area 4).
- Discuss and outline a proposal of study (that can be accomplished within one semester term) with a supervising instructor qualified within the discipline.
- Design an independent study (to be completed individually or by collaboration of a small group) to foster special knowledge, skills, and experience that are not available in any one regularly scheduled course.
- Use information resources to gather discipline-specific information.
- SLO #2: Utilize modes of analysis and critical thinking to apply theoretical perspectives and/or concepts in the major discipline of study to significant problems and/or educational activities (College Wide Learning Outcome – Area 3).
- Analyze and apply the knowledge, skills and experience that are involved in the independent study to theoretical perspectives and/or concepts in the major discipline of study.
- Explain the importance of the major discipline of study in the broader picture of society.
- SLO #3: Communicate a complex understanding of content matter of the major discipline of study (College Wide Outcome – Area 3).
- Demonstrate competence in the skills essential to mastery of the major discipline of study that are necessary to accomplish the independent study.
- SLO #4: Identify personal goals and pursue these goals effectively (College Wide Outcome – Area 4).
- Utilize skills from the "academic tool kit" including time management, study skills, etc., to accomplish the independent study within one semester term.

FT 498 Work Experience in Fire Technology

Units: 1 - 4  
Hours: 60 - 300 hours LAB  
Prerequisite: None.  
Enrollment Limitation: Students must be in a paid or unpaid internship, volunteer position or job related to career goals in Fire Technology.  
Transferable: CSU  
General Education: AA/AS Area III(b)  
Catalog Date: June 1, 2020

This course provides students with opportunities to develop marketable skills in preparation for employment in their major field of study or advancement within their career. It is designed for students interested in work experience and/or internships in transfer level degree occupational programs. Course content includes understanding the application of education to the workforce; completion of required forms which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. Appropriate level learning objectives are established by the student and the employer. During the semester, the student is required to participate in a weekly orientation and 75 hours of related paid work experience, or 60 hours of unpaid work experience for one unit. An additional 75 or 60 hours of related work experience is required for each additional unit. Work Experience may be taken for a total of 16 units when there are new or expanded learning objectives. Only one Work Experience course may be taken per semester.

Student Learning Outcomes

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

- DEMONSTRATE AN UNDERSTANDING AND APPLICATION OF PROFESSIONAL WORKPLACE BEHAVIOR IN A FIELD OF STUDY RELATED ONE'S CAREER.(SLO 1)
- Understand the effects time, stress, and organizational management have on performance.
- Demonstrate an understanding of consistently practicing ethics and confidentiality in a workplace.
- Examine the career/life planning process and relate its relevancy to the student.
- Demonstrate an understanding of basic communication tools and their appropriate use.
- Demonstrate an understanding of workplace etiquette.
- DESCRIBE THE CAREER/LIFE PLANNING PROCESS AND RELATE ITS RELEVANCY TO ONE'S CAREER.(SLO 2)
- Link personal goals to long term achievement.
- Display an understanding of creating a professional first impression.
- Understand how networking is a powerful job search tool.
- Understand necessary elements of a résumé.
- Understand the importance of interview preparation.
- Identify how continual learning increases career success.
- DEMONSTRATE APPLICATION OF INDUSTRY KNOWLEDGE AND THEORETICAL CONCEPTS AS WRITTEN IN LEARNING OBJECTIVES IN PARTNERSHIP WITH THE EMPLOYER WORK SITE SUPERVISOR.(SLO 3)

FT 499 Experimental Offering in Fire Technology

Units: 0.5 - 4  
Prerequisite: None.  
Transferable: CSU  
Catalog Date: June 1, 2020

Firefighting Training Center (FIRE) Courses

FIRE 299 Experimental Offering in Firefighting Training Center

Units: 0.5 - 4  
Prerequisite: None.  
Catalog Date: June 1, 2020
FIRE 1130 Company Officer 2A (Human Resource Management for Company Officers)

This course provides information on the use of human resources to accomplish assignments, evaluate member performance, supervise personnel, and integrate health and safety plans, policies, and procedures into daily activities as well as the emergency scene. Topics include human resource management, and health and safety. This course is offered as a Pass/No Pass course only.

Student Learning Outcomes

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

- SLO 1: Apply and follow human resource policies and procedures, given an administrative situation requiring action.
- List human resources organizational policies that a Company Officer Level 1 is responsible for.
- SLO 2: Create a professional development plan for a member of the organization.
- Identify the steps for creating a professional development plan.
- List professional development options, such as: job shadowing, mentoring, continuing education.

FIRE 1131 Company Officer 2B (General Administration Functions for Company Officers)

This course provides information on general administrative functions and the implementation of department policies and procedures, and addresses conveying the fire department's role, image, and mission to the public. Topics include administration, and community and government relations. Pass/No Pass only.

Student Learning Outcomes

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

- SLO 1: Specify the impact of state and federal laws and regulations as they apply to the company officer
- Contrast civil and criminal liability, given a list of state and federal laws and regulations pertaining to fire service supervisors.
- SLO 2: List the benefits to the organization and the purpose for establishing cooperative external agency relationships.
- Given a specific problem or issue in the community and a list of local, state, and national resources.

FIRE 1132 Company Officer 2C (Fire Inspections and Investigation for Company Officers)

This course provides information on conducting inspections, identifying hazards and addressing violations, performing a fire investigation to determine preliminary cause, and securing the incident scene and preserving evidence. Topics include orientation, fire and life safety inspections, and fire investigation. Pass/No Pass only.

Student Learning Outcomes

Upon completion of this course, the student will be able to:
SLO 1: Describe the procedures for conducting fire inspections.
   - Identify hazards, including hazardous materials; completing approved forms; and initiating approved follow up action, given the policies of the agency.
   - SLO 2: Employ measures to secure an incident scene with recognizable perimeters.
   - Describe actions needed to keep unauthorized persons from restricted areas.
   - Implement measures to protect all evidence or potential evidence from damage or destruction.

FIRE 1133 Company Officer 2D (All-Risk Operations for Company Officers)

**Units:** 1.25  
**Hours:** 20 hours LEC; 20 hours LAB  
**Prerequisite:** Meet the educational requirements for Office of the State Fire Marshal (OSFM) Fire Fighter II. The rank of Officer waives this prerequisite. The CAL FIRE rank of Fire Apparatus Engineer is equivalent to Officer level. Performing in an “acting” capacity does not qualify for this waiver.  
**Enrollment Limitation:** Completion of Incident Command System (I-200), which is an online course offered by Federal Emergency Management Agency (FEMA).  
**Catalog Date:** June 1, 2020

This course provides information on conducting incident size-up, developing and implementing an initial plan of action involving single and multiunit operations for various types of emergency incidents to mitigate the situation following agency safety procedures, conducting preincident planning, and develop and conduct a post-incident analysis. Topics include initial Incident Action Plan (IAP), postincident analysis, operational planning, and service demands. Pass/No Pass only.

**Student Learning Outcomes**

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

- SLO 1: Develop an initial plan of action, identifying the resources required to control the emergency.
- Implement a plan of action at a simulated emergency operation, deploying resources to mitigate the situation.
- SLO 2: Develop and conduct a post incident analysis.
- Identify and communicate all required critical elements and complete and process the approved forms in accordance with policies and procedures.
- SLO 3: Identify elements of operational plans.
- Obtain required resources and their assignments, mitigating the incident.
- Write a report identifying the major causes for service demands for various planning areas within the organization’s service area.

FIRE 1134 Company Officer 2E (Wildland Incident Operations for Company Officers)

**Units:** 1.75  
**Hours:** 28 hours LEC; 12 hours LAB  
**Prerequisite:** Meet the educational requirements for Office of the State Fire Marshal (OSFM) Fire Fighter II. The rank of Officer waives this prerequisite. The CAL FIRE rank of Fire Apparatus Engineer is equivalent to Officer level. Performing in an “acting” capacity does not qualify for this waiver.  
**Catalog Date:** June 1, 2020

This course provides information on evaluating and reporting incident conditions, analyzing incident needs, developing and implementing a plan of action to deploy incident resources completing all operations to suppress a wildland fire, establishing an incident command post, creating and incident action plan, and completing incident records and reports. Topics include report on conditions, ongoing incident conditions, establishing an incident command post, deploying resources, incident needs, suppression operations, personnel needs and issues, and incident records and reports. Pass/No Pass only.

**Student Learning Outcomes**

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

- SLO 1: Employ information regarding travel route, assignment, time needed, and point of contact from dispatch.
- Describe the response to incidents occurring under different jurisdictional authorities (Local, State, Federal).
- SLO 2: Develop an initial report on conditions that communicates required incident information.
- Describe the relevant incident information to be communicated.
- SLO 3: Demonstrate the ability to size up an incident to formulate an incident action plan that sets incident objectives and applies strategies and tactics according to agency policy, using an Incident Command System (ICS) 201 Incident Briefing form.
- Describe the elements of a wildland size-up.
- Interpret fire behavior.
- Describe resource availability and capability.
- SLO 4: Evaluate incident conditions, identify progress, changes in fuels, topography, weather, fire behavior, personnel safety, and other significant events, and communicate these conditions to the supervisor and to assigned and adjoining personnel.
- Describe how to evaluate wildland fire weather, fuels, and topographic information.
- Describe current and predicted fire behavior.
- SLO 5: Determine an incident command post.
- Describe factors affecting appropriate incident command post locations.
- SLO 6: Describe proper emergency medical procedures.
- Describe agency accident and illness reporting procedures.
Describe the procedures for using the ICS 206 Medical Plan form.

SLO 7: Deploy resources to suppress a wildland fire, taking appropriate suppression actions and ensuring personnel safety.

Describe ways to update supervisors, crew members, and adjoining personnel.

Analyze incident needs.

Describe how to provide for assigned resources’ needs.

SLO 8: Demonstrate how to maintain wildland incident records.

Prepare final incident reports.

SLO 9: Verify the qualifications of assigned personnel to verify that individuals’ fire fighter skills are appropriate.

Identify the agency’s qualifications standards.

Describe the assessment of personnel qualifications for assignment in accordance with agency policies and procedures.

FIRE 1140 Chief Fire Officer 3A: Human Resources Management

Units: 1
Hours: 16.25 hours LEC; 9.75 hours LAB
Prerequisites: Meet the educational requirements for Company Officer, or seeking Fire Marshal Certification or four (4) years as a career fire fighter, or six (6) years as a volunteer fire fighter.
Enrollment Limitation: Meet the educational requirements for Company Officer.
Catalog Date: June 1, 2020

This course provides students with a basic knowledge of the human resources requirements related to the roles and responsibilities of a chief fire officer. Topics include developing plans for providing employee accommodation, developing hiring procedures, establishing personnel assignments, describing methods of facilitating and encouraging professional development, developing an ongoing education training program, developing promotion procedures, developing proposals for improving employee benefits, and developing a measurable accident and injury prevention program. Pass/No Pass only.

Student Learning Outcomes

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

- SLO 1: Describe the certification task book and testing process for chief fire officer.
- Identify the prerequisite qualifications, and the human resource management, community and government relations, administrative, inspection and investigation, emergency service delivery, health and safety, and emergency management duties of a chief fire officer.
- Identify the prerequisite knowledge and mobilization and suppression duties of a wildland fire officer II.
- SLO 2: Develop a plan for providing an employee accommodation, including adequate information to justify the requested change(s).
- Develop procedures for hiring members, ensuring a valid and reliable process.
- Establish personnel assignments, maximizing efficiency in accordance with policies and procedures.
- Define the requirements of the California Firefighters Procedural Bill of Rights Act as they apply to the roles and responsibilities of the chief fire officer.
- SLO 3: Describe methods of facilitating and encouraging members to participate in professional development to achieve their personal and professional goals.
- Develop an ongoing education training program, giving members of the organization appropriate training to meet the mission of the organization.
- Develop procedures and programs for promoting members, ensuring a valid, reliable, job-related, and nondiscriminatory process.
- SLO 4: Develop a proposal for improving an employee benefit, including adequate information to justify the requested benefit improvement.
- Conduct research as needed to develop a benefit improvement proposal.
- SLO 5: Develop a measurable accident and injury prevention program, evaluating results to determine program effectiveness.

FIRE 1141 Chief Fire Officer 3B: Budget and Fiscal Responsibilities

Units: 0.5
Hours: 9.5 hours LEC; 8.5 hours LAB
Prerequisites: Meet the educational requirements for Company Officer or five (5) years as a career officer (Lieutenant or higher), or seven (7) years as a volunteer officer (Lieutenant or higher) or five (5) years as a CAL FIRE Fire Apparatus Engineer.
Enrollment Limitation: Meet the educational requirements for Company Officer.
Catalog Date: June 1, 2020

This course provides students with a basic knowledge of the budgeting requirements related to the roles and responsibilities of a Chief Fire Officer. Topics include developing a budget management system, developing a division or departmental budget, and describing the process for ensuring competitive bidding. Pass/No Pass only.

Student Learning Outcomes

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

- SLO 1: Describe the certification task book and testing process for chief fire officer.
- SLO 2: Develop a budget management system to keep the division or department within the budgetary authority.
- Identify the operation and maintenance costs associated with existing and new programs, facilities, equipment, and fleet.
- SLO 3: Develop a divisional or departmental budget, determining and justifying capital, operating, and personnel costs.
- Describe the agency's process for ensuring competitive bidding, including developing requests for proposal (RFPs) and soliciting and awarding bids.
FIRE 1142 Chief Fire Officer 3C: General Administration
Functions for Chief Fire Officers

This course provides a basic knowledge of the administration requirements related to the roles and responsibilities of a Chief Fire Officer. Topics include directing a department records management system, analyzing and interpreting records and data, developing a model plan for continuous organizational improvement, developing a plan to facilitate approval, preparing community awareness programs, and evaluating the inspection program of the Agency Having Jurisdiction (AHJ). Pass/No Pass only.

Student Learning Outcomes

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

- SLO 1: Identify different levels in the Executive Chief Officer certification track, the courses and requirements for Chief Fire Officer certification, and be able to describe the certification task book and testing process.
- SLO 2: Direct the development, maintenance, and evaluation of a department record management system, ensuring the achievement of completeness and accuracy.
- SLO 3: Develop a model plan for continuous organizational improvement, maximizing resource utilization.
- SLO 4: Evaluate the inspection program of the AHJ, assessing results to determine effectiveness.
- SLO 5: Identify applicable policies, procedures, codes, standards, and laws.

FIRE 1144 Chief Fire Officer 3D: Command of Expanding All-Hazard Incidents

This course provides a basic knowledge of the administration requirements related to the roles and responsibilities of a Chief Fire Officer. Topics include developing an agency resource contingency plan, evaluating incident facilities, supervising multiple resources, developing and utilizing an incident action plan, obtaining incident information to facilitate transfer of command, developing and conducting a post-incident analysis, and maintaining incident records. Pass/No Pass only.

Student Learning Outcomes

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

- SLO 1: Identify different levels in the Executive Chief Officer certification track, the courses and requirements for Chief Fire Officer certification, and be able to describe the certification task book and testing process.
- SLO 2: Identify jurisdictional authority.
- SLO 3: Obtain incident information from the initial incident commander to ensure the new incident commander has the information necessary to operate and complete the transfer of command.
- SLO 4: Demonstrate continuously improving situational awareness, perform a hazard assessment, and apply an ongoing risk-management process.
- SLO 5: Prepare, review, validate, modify, and document an incident action plan for each operational period.
- SLO 6: Demonstrate the ability to order resources according to the incident priorities and objectives.

George Apple

Ted Collins
Adjunct Fire Tech Professor

George Apple's Profile Page (/about-us/contact-us/faculty-and-staff-directory/george-apple)

Email: appleg@crc.losrios.edu (mailto:appleg@crc.losrios.edu)
Phone: (916) 691-7200
Web:

Adjunct Fire Tech Professor

Ted Collins's Profile Page (/about-us/contact-us/faculty-and-staff-directory/ted-collins)

Email: collint@crc.losrios.edu (mailto:collint@crc.losrios.edu)
Phone: (916) 691-7200
Web:

Adjunct Fire Tech Professor

Richard Haas's Profile Page (/about-us/contact-us/faculty-and-staff-directory/richard-haas)

Email: haasr@crc.losrios.edu (mailto:haasr@crc.losrios.edu)
Phone: (916) 691-7200
Web:

Adjunct Fire Tech Professor

Robert Henkens's Profile Page (/about-us/contact-us/faculty-and-staff-directory/robert-henkens)

Email: henkenr@crc.losrios.edu (mailto:henkenr@crc.losrios.edu)
Phone: (916) 691-7200
Web:

Kris Hubbard
Fire Technology Coordinator

Kris Hubbard's Profile Page (/about-us/contact-us/faculty-and-staff-directory/kris-hubbard)

Email: hubbark@crc.losrios.edu (mailto:hubbark@crc.losrios.edu)
Phone: (916) 691-7769
Web:

Mark Swink
Adjunct Fire Tech Professor

Mark Swink's Profile Page (/about-us/contact-us/faculty-and-staff-directory/mark-swink)

Email: swinkm@crc.losrios.edu (mailto:swinkm@crc.losrios.edu)
Phone: (916) 691-7200
Web:

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