



Aerial Apparatus Operations

Course Plan

Course Details

- Certification:** Aerial Apparatus Driver/Operator (2017)
- CTS Guide:** Fire Apparatus Driver/Operator (2017)
- Description:** This course provides the knowledge and skills needed to operate and perform preventive maintenance on an aerial apparatus. Topics include routine testing, inspections, and servicing functions on systems and components unique to an aerial apparatus; maneuvering, positioning, and stabilizing an aerial apparatus; maneuvering, positioning, and lowering the aerial device; and deploying and operating an elevated master stream.
- Designed For:** Personnel who drive and operate a fire department aerial apparatus
- Course Prerequisites:** OSFM certified Fire Fighter 1 or certified Fire Fighter 2 tenured path (Appointment to the rank of Officer (Lieutenant or higher) waives this prerequisite. Appointment to the CAL FIRE rank of Fire Apparatus Engineer is equivalent to Officer level. Performing in an “acting” capacity does not fulfill this requirement.)
- 1A: Fire Apparatus Driver/Operator (2008 or newer)
- One of the following driver’s licenses: Class C fire fighter endorsed, Commercial A, or Commercial B
- Minimum four hours driving an aerial apparatus
- Standard:** Complete all skills, activities, and tests
- Complete the summative test with a minimum score of 80%
- Hours (Total):** 40 hours (20 lecture / 20 application)
- Maximum Class Size:** 30
- Instructor Level:** One primary instructor and sufficient assistant instructors to meet skills ratio requirements
- Instructor/Student Ratio:** 1:30 (Lecture) / 1:10 (Application)
- Restrictions:** Sufficient fire apparatus and space to accommodate classroom and skills training
- SFT Designation:** CFSTES

Table of Contents

Required Resources.....	3
Instructor Resources	3
Online Instructor Resources.....	3
Student Resources	3
Facilities, Equipment, and Personnel	3
Time Table	5
Time Table Key	5
Unit 1: Introduction	7
Topic 1-1: Orientation and Administration	7
Topic 1-2: Aerial Apparatus Driver/Operator Certification	8
Unit 2: Preventative Maintenance	9
Topic 2-1: Performing and Documenting Visual and Operation Checks	9
Unit 3: Operations.....	11
Topic 3-1: Maneuvering and Positioning an Aerial Apparatus.....	11
Topic 3-2: Stabilizing an Aerial Apparatus.....	12
Topic 3-3: Maneuvering and Positioning an Aerial from Each Control Station.....	13
Topic 3-4: Lowering an Aerial Using the Emergency Operating System	14
Topic 3-5: Deploying and Operating an Elevated Master Stream	15
How to Read a Course Plan	16

Required Resources

Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, current edition)
- or
- *Pumping and Aerial Apparatus Driver/Operator Handbook*, (IFSTA, current edition)
- Maintenance and inspection forms
- Manufacturer's specifications and requirements

Online Instructor Resources

The following instructor resources are available online at

<https://osfm.fire.ca.gov/divisions/state-fire-training/cfstes-professional-certification/>:

- Aerial Apparatus Operations required activities
 - Activity 3-1: Maneuver and Position an Aerial Apparatus
 - Activity 3-2: Stabilize an Aerial Apparatus
 - Activity 3-3: Maneuver and Position an Aerial from Each Control Station
 - Activity 3-4: Lower an Aerial Using the Emergency Operation System
 - Activity 3-5: Deploy and Operate Using an Elevated Master Stream

Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, current edition)
- or
- *Pumping and Aerial Apparatus Driver/Operator Handbook*, (IFSTA, current edition)
- Personal protective equipment

Facilities, Equipment, and Personnel

The following facilities, equipment, or personnel are required to deliver this course:

- Standard learning environment or facility
- Writing board or paper conference pads
- Markers, erasers
- Computer or tablet with presentation or other viewing software
- Amplification devices
- Projector and screen
- Qualified assistant (as needed)
- Sufficient aerial apparatus to accommodate the number of students in the class
 - Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-5

- Tools and equipment for inspection and testing
- Personal protective equipment (students)
- Pressurized water source
- Facility and/or location with space sufficient to accommodate maneuvering the apparatus and deploying the aerial, stabilizing the apparatus and transferring power, maneuvering, stabilizing, and lowering the aerial device, deploy and operate an elevated master stream

Time Table

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.5	0.0	
Topic 1-2: Aerial Apparatus Driver/Operator Certification	0.5	0.0	
Unit 1 Totals	1.0	0.0	1.0
Unit 2: Preventative Maintenance			
Topic 2-1: Perform Visual and Operation Checks	6.0	1.0	
Unit 2 Totals	6.0	1.0	7.0
Unit 3: Operations			
Topic 3-1: Maneuver and Position an Aerial Apparatus	4.0	*	
Topic 3-2: Stabilize an Aerial Apparatus	1.5	*	
Topic 3-3: Maneuver and Position an Aerial Device from Each Control Station	3.5	*	
Topic 3-4: Lower an Aerial Device Using the Emergency Operating System	2.0	*	
Topic 3-5: Deploy and Operate an Elevated Master Stream	2.0	*	
Unit 3 Totals	13.0	18.0	
Summative Assessment			
Determined by AHJ or educational institution	TBD	1.0	1.0
Skills Practice (Lab / Sets and Reps)			
Determined by AHJ or educational institution	TBD	TBD	TBD
Course Totals	20.0	20.0	40.0

* Individual application time determined by instructor for a total of 18 hours for Unit 3. Recommend at least 30 minutes of drive time per student across Topics 3-1 through 3-5.

Time Table Key

1. The Time Table documents the amount of time required to deliver the content included in the course plan.
2. Time is documented using the quarter system: 15 min. = .25 / 30 min. = .50 / 45 min. = .75 / 60 min. = 1.0.
3. The Course Totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment). It is the instructor's responsibility to add this time based on the course delivery schedule.

4. Application (activities, skills exercises, and formative testing) time will vary depending on the number of students enrolled. The Application time documented is based on the maximum class size identified in the Course Details section.
5. Summative Assessments are determined and scheduled by the authority having jurisdiction. These are not the written or psychomotor State Fire Training certification exams. These are in-class assessments to evaluate student progress and calculate course grades.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, skills exercises, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities and skills exercises
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 1-2: Aerial Apparatus Driver/Operator Certification

Terminal Learning Objective

At the end of this topic a student will be able to identify the requirements for Fire Apparatus Driver/Operator – Aerial Apparatus certification and be able to describe the certification task book and examination process.

Enabling Learning Objectives

1. Identify the prerequisites for certification
 - OSFM certified Fire Fighter 1
 - or**
 - Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer waives this certification prerequisite. (*Performing in an “acting” capacity does not fulfill this requirement.*)
 - and**
 - Valid Class C Firefighter Endorsed **or** Commercial A **or** Commercial B driver’s license (per California Vehicle Code, Section 12804.11)
2. Identify the courses required for certification
 - 1A: Fire Apparatus Driver/Operator (2008 or newer)
 - 1C: Aerial Apparatus Operations (2008 or newer)
3. Identify the exams required for certification
 - No exams outside of class testing
4. Identify the task book requirements for certification
 - Aerial Apparatus Driver/Operator Certification Task Book (2017)
5. Identify the experience requirements for certification (one of the following)
 - A minimum of one year full-time paid experience in a California fire department with the primary responsibility as an aerial apparatus driver/operator
 - A minimum of two years volunteer or part-time paid experience in a California fire department with the primary responsibility as an aerial apparatus driver/operator
6. Identify the position requirements for certification
 - Appointed to the rank or position of Fire Apparatus Driver/Operator (performing in an acting capacity does not qualify)
7. Describe the certification task book process
8. Describe the certification examination process
 - Not applicable

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Preventative Maintenance

Topic 2-1: Performing and Documenting Visual and Operation Checks

Terminal Learning Objective

At the end of this topic a student, given an aerial apparatus, tools and equipment, maintenance and inspection forms, manufacturer specifications and requirements, and policies and procedures of the jurisdiction, will be able to perform and document routine tests, inspections, and servicing functions on the systems and components unique to an aerial apparatus to verify their operational readiness.

Enabling Learning Objectives

1. Identify manufacturer specifications and requirements
2. Identify AHJ policies and procedures
 - Frequency
 - Standard
 - Documentation requirements
3. Identify vehicle systems and components
 - Battery(ies)
 - Braking system
 - Coolant system
 - Electrical system
 - Fuel
 - Hydraulic fluids
 - Oil
 - Tires
 - Steering system
 - Belts
 - Tools, appliances, and equipment
 - Built-in safety features
4. Describe systems and components unique to an aerial apparatus
 - Aerial electrical systems
 - Aerial hydraulic systems
 - Aerial safety systems
 - Aerial ladder
 - Aerial waterway
 - Breathing air systems
 - Cable systems (if applicable)
 - Communication systems
 - Slides and rollers
 - Stabilizing systems
5. Use tools and equipment
6. Inspect aerial apparatus and components
7. Recognize system problems and out-of-service criteria

8. Correct any deficiency noted according to policies and procedures and/or manufacturer specifications and requirements

Discussion Questions

1. How often should you perform maintenance and inspections on an aerial apparatus?
2. What issues will take an aerial device out of service?
3. How often is your aerial ladder recertified? By whom?

Application

1. Given an aerial apparatus and inspection forms, divide students into small groups, have each group perform an aerial apparatus inspection and present their findings.

Instructor Notes:

1. Bring materials for the Application.

CTS Guide Reference: 6-1

Unit 3: Operations

Topic 3-1: Maneuvering and Positioning an Aerial Apparatus

Terminal Learning Objective

At the end of this topic a student, given an aerial apparatus, an incident location, a situation description, and an assignment will be able to maneuver and position an aerial apparatus for correct aerial device deployment.

Enabling Learning Objectives

1. Describe uses of an aerial device
2. Identify capabilities and limitations of aerial devices
 - Reach
 - Tip load
 - Angle of inclination
3. Describe the effects of topography, ground, and weather conditions on deployment
4. Describe aerial apparatus placement options
5. Identify communication needs between aerial driver/operator and crew
6. Determine load limit of the aerial device
 - Read and understand an aerial ladder load chart
7. Determine a correct position for the apparatus
8. Maneuver the apparatus into the correct position
9. Avoid obstacles to operations

Discussion Questions

1. What considerations go into stabilizer deployment?
2. How should an aerial apparatus be placed at a/an _____ incident?
3. What is the maximum degree of slope allowable to maintain full aerial capabilities?
4. Can you operate below grade? If yes, how far?

Application

1. Activity 3-1: Maneuver and Position an Aerial Apparatus

Instructor Notes:

1. None

CTS Guide Reference: 7-1

Topic 3-2: Stabilizing an Aerial Apparatus

Terminal Learning Objective

At the end of this topic a student, given a positioned aerial apparatus and manufacturer's specifications and requirements, will be able to stabilize an aerial apparatus and transfer power to the aerial hydraulic system in order to deploy the aerial.

Enabling Learning Objectives

1. Describe aerial apparatus hydraulic systems
2. Identify manufacturer's specifications and requirements for stabilization
 - A-frame
 - H configuration
 - Torque box
3. Identify reasons for short jacking and its limitations
4. Describe the effects of topography and ground conditions on stabilization
5. Transfer power from the aerial apparatus engine to the hydraulic system
6. Operate aerial apparatus stabilization devices

Discussion Questions

1. What factors should you consider when placing your stabilizers?
2. What is short jacking? When is it used?
3. Where do you place your chock blocks?
4. Do you need to raise the tires off the ground for proper stabilization?

Application

1. Activity 3-2: Stabilize an Aerial Apparatus

Instructor Notes:

1. None

CTS Guide Reference: 7-2

Topic 3-3: Maneuvering and Positioning an Aerial from Each Control Station

Terminal Learning Objective

At the end of this topic a student, given a stabilized aerial apparatus, an incident location, a situation description, and an assignment, will be able to maneuver and position the aerial from each control station (if applicable) to accomplish the assignment.

Enabling Learning Objectives

1. Describe aerial hydraulic systems
2. Describe hydraulic pressure relief systems
3. Identify gauges and controls
4. Describe cable systems
5. Describe communications systems
6. Describe electrical systems
7. Describe emergency operating systems
8. Explain locking systems
 - Cable dog locks
 - Holding valves
9. Describe platform stabilization
10. Describe manual rotation and lowering systems
11. Describe aerial safety systems
12. Describe system overrides and the hazards of using overrides
13. Describe safe operational limitations of the given aerial
14. Describe aerial safety procedures
15. Describe operations near electrical hazards and overhead obstructions
16. Raise, rotate, extend, align rungs, and position to a specified location and lock
17. Lock, unlock, retract, rotate, lower, and bed the aerial

Discussion Questions

1. When do you use your overrides in a nonemergency situation?
2. What is your jurisdiction's policy for operating near power lines?
3. How do you decrease ladder fatigue and damage when operating the aerial?
4. What hazards are associated with a supported aerial?
5. What happens if you operate multiple levers at the same time?
6. What is the closed or retracted measurement of your aerial?
7. What ladder position offers the most stability? Why?
8. If there is a hydraulic failure, what holds the ladder in position?

Application

1. Activity 3-3: Maneuver and Position an Aerial from Each Control Station

Instructor Notes:

1. None

CTS Guide Reference: CTS 7-3 and CTS 7-4

Topic 3-4: Lowering an Aerial Using the Emergency Operating System

Terminal Learning Objective

At the end of this topic a student, given a deployed aerial device, will be able to lower an aerial device using the emergency operating system to its bedded position.

Enabling Learning Objectives

1. Describe emergency operating systems
2. Describe manual rotation and lowering systems
3. Describe stabilizing systems
4. Describe system overrides
5. Describe safety systems specific to aerial override systems
6. Identify hazards of using overrides
7. Describe safety procedures specific to the aerial
8. Unlock, retract, rotate, lower, and bed the aerial using the emergency operating system

Discussion Questions

1. Who manages the emergency system overrides?
2. In which situations should you use manual overrides?
3. Which sensors are disabled in override mode?
4. What is an EPU? Where is it? What is its maximum running time?

Application

1. Activity 3-4: Lower an Aerial Device Using the Emergency Operating System

Instructor Notes:

1. None

CTS Guide Reference: CTS 7-4

Topic 3-5: Deploying and Operating an Elevated Master Stream

Terminal Learning Objective

At the end of this topic a student, given a stabilized aerial, a pumping apparatus, a pressurized water source, a master stream device, and a desired flow, will be able to deploy and operate an elevated master stream so the stream is effective and the aerial and master stream device are operated correctly.

Enabling Learning Objectives

1. Describe types of elevated master stream devices and waterways
2. Describe how to operate master stream devices
 - Manually
 - Remotely
3. Describe nozzle reaction
4. Describe range of operation
5. Describe waterway locking systems
6. Identify communication needs between aerial driver/operator, pump driver/operator, and crew
7. Identify weight limitations
8. Describe a removeable/temporary ladder pipe master stream
9. Connect a water supply to a master stream device
10. Deploy a fixed water supply
11. Deploy and control an elevated nozzle manually or remotely

Discussion Questions

1. What is the maximum lateral movement of the stream?
2. What is the sequence to start and stop the flow of water from the nozzle?
3. What are your limitations with water tower operations?
4. Do you wear a ladder belt when operating at the tip of a master stream?
5. What are some friction loss considerations when flowing an aerial master stream?

Application

1. Activity 3-5: Deploy and Operate an Elevated Master Stream

Instructor Notes:

1. None

CTS Guide Reference: 7-5

How to Read a Course Plan

A course plan identifies the details, logistics, resources, and training and education content for an individual course. Whenever possible, course content is directly tied to a national or state standard. SFT uses the course plan as the training and education standard for an individual course. Individuals at fire agencies, academies, and community colleges use course plans to obtain their institution's consent to offer course and provide credit for their completion. Instructors use course plans to develop syllabi and lesson plans for course delivery.

Course Details

The Course Details segment identifies the logistical information required for planning, scheduling, and delivering a course.

Required Resources

The Required Resources segment identifies the resources, equipment, facilities, and personnel required to deliver the course.

Unit

Each Unit represents a collection of aligned topics. Unit 1 is the same for all SFT courses. An instructor is not required to repeat Unit 1 when teaching multiple courses within a single instructional period or academy.

Topics

Each Topic documents a single Terminal Learning Objective and the instructional activities that support it.

Terminal Learning Objective

A Terminal Learning Objective (TLO) states the instructor's expectations of student performance at the end of a specific lesson or unit. Each TLO includes a task (what the student must be able to do), a condition (the setting and supplies needed), and a standard (how well or to whose specifications the task must be performed). TLOs target the performance required when students are evaluated, not what they will do as part of the course.

Enabling Learning Objectives

The Enabling Learning Objectives (ELO) specify a detailed sequence of student activities that make up the instructional content of a lesson plan. ELOs cover the cognitive, affective, and psychomotor skills students must master in order to complete the TLO.

Discussion Questions

The Discussion Questions are designed to guide students into a topic or to enhance their understanding of a topic. Instructors may add to or adjust the questions to suit their students.

Application

The Application segment documents experiences that enable students to apply lecture content through cognitive and psychomotor activities, skills exercises, and formative testing. Application experiences included in the course plan are required. Instructors may add additional application experiences to suit their student population if time permits.

Instructor Notes

The Instructor Notes segment documents suggestions and resources to enhance an instructor's ability to teach a specific topic.

CTS Guide Reference

The CTS Guide Reference segment documents the standard(s) from the corresponding Certification Training Standard Guide upon which each topic within the course is based. This segment is eliminated if the course is not based on a standard.

Skill Sheet

The Skill Sheet segment documents the skill sheet that tests the content contained within the topic. This segment is eliminated if the course does not have skill sheets.