

VALLEY ROP COURSE OUTLINE

COURSE TITLE: Introduction to Fire Technology

VALLEY ROP #: PS-5831-FrTech
CDE #: 540

CBEDS TITLE: Fire Control and Safety
CBEDS #: 5840

CTE SECTOR: Public Services
CTE PATHWAY: Protective Services

JOB TITLES:

Fire Fighters	33-2011.00
Foresters	19-1032.00
Forest & Conservation Tech.	19-4093.00
Operating Eng. & other construction Eq. Operators	47-2073.00
Forest Fire Fighters	33-2011.02
First line Supervisors/Manager of Agricultural Corp. & Horticulture workers	45-1011.07
Forest & Conservation workers	45-4011.00
Municipal Fire Fighting & Prevention Supervisors	33-1021-00
Police, Fire & Ambulance Dispatcher	43-5031.00
Municipal Fire Fighters	33-2011.01
Fire Inspectors	33-2021.01
Insurance Adjustors, Examiners & Investigators	13-1031.02
Fire Investigations	33-2021.02
Fire Inspectors & Prevention Specialist	33-2022.00

COURSE DESCRIPTION:

This course introduces students to fire protection, career opportunities in fire protection and related fields, philosophy and history of fire protection, and fire loss analysis. Students will research the organization and function of public and private fire protection services, fire departments as a part of local government, laws and regulations affecting the fire service, and fire service nomenclature. It covers basic fire chemistry and physics.

DATE APPROVED: Created from FCC Fire Protection Organization April 2000
REVISED DATE: November 4, 2004; January 23, 2006; December 11, 2008
May 2009 /Nov 2009
HOURS: 180 per semester
CREDITS: 10 per semester

PREREQUISITES: None
GRADE LEVEL: 11-12

ARTICULATION(S): 2 + 2 + 2 articulation with Fresno City College (T-111F/spr08)

TEXTBOOKS: Klinoff, Robert. *Introduction to Fire Protection*, 2nd, 2000, Delmar Publishers, Albany, NY

RESOURCES: CDF Training Manual
USFS Training Manual

COURSE COMPETENCIES:

Upon successful completion of the course, the student will:

1. Describe the educational requirements, duties, and information sources for various occupations in fire protection and related positions in the fire industry (environmental horticulture, agriculture, natural resources).
2. Identify the basic components of fire as a chemical reaction, the major phases of fire, and the main factors that influence fire spread and behavior.
3. identify the effects of fire on the environment and the historical efforts made to protect society.
4. Identify the major organizations that contribute to fire protection.
5. Define and describe the purpose and scope of fire departments .Identify the types f common fire department apparatus, equipment, and personal safety equipment used for fire fighting.
6. Identify the various codes, standards, ordinances, and regulations that affect fire protection.
7. Identify the various types of public and private fire protection equipment and systems.
8. Define the common elements of a fire prevention bureau.
9. Define fire fighting strategy and tactics.
10. Describe the basic elements of fire fighter safety and survival.
11. Demonstrate competency in the fundamentals of fire service and fire protection through project-based achievements.
12. Develop a positive work ethic and attitude towards working.
13. Understand the importance of analyzing and comparing various career choices and the determination of jobs best suited to the individual's abilities needs, and interests.
14. Accurately complete job search materials—applications, resumes, thank you letters.
15. Develop job search skills and proper written and oral communication skills
16. Develop techniques and skills for proper interviewing.

INSTRUCTIONAL METHODS:

1. Lecture
2. Individual instruction where needed
3. Guest Lecturers
4. Educational Videos
5. Demonstrations
6. Student Applications

ASSIGNMENTS:

1. Reading assignments will be given throughout the course in the text and in suggested references and periodicals.
2. In small groups, prepare a written and oral analysis of a fire technology related subject chosen and researched by the group. The student will demonstrate an ability to operate within a team environment, to research and to orally present information.
3. Individually, complete a fire pre-plan inspection.
4. In small groups, research a department with the fire service and write an informational report.

EVALUATION METHODS:

Assessment opportunities, which allow continuous evaluation of students' progress, will be embedded throughout the course and should be a learning experience. All students will be expected to achieve mastery of all topics; often, demonstrations of mastery will occur in a public forum. The following strategies, which include both formal and informal assessment techniques will include, but are not limited to:

- | | |
|---|-----|
| 1. Analytical Research Paper (skills & job match) | 15% |
| 2. Informational Research Paper (fire agency) | 15% |
| 3. Pre-Plan Inspection Project | 15% |
| 4. Attendance/Participation | 15% |
| 5. Written Quizzes | 10% |
| 6. Employability Research and Portfolio Development | 20% |
| 7. Oral Presentations and Mock Interviews | 10% |

COURSE OUTLINE:

Unit of Instruction

Estimated Hours

Introduction to Fire Technology

8

- Scope and Content of the Fire Technology Curriculum
 - College Certificate of Completion
 - Associate Degree
 - Bachelor's Degree
 - State Certification Crossover
- Career Potential Assessment
 - Assessing an Agency
 - Applying for the Job
 - Employment Processes
 - Physical Fitness Assessment
 - Career Counseling
- Affirmative Action
 - Cultural Differences
 - Gender Stereotypes
 - Ethnic Stereotypes
 - Cross Cultural and Gender Communications
 - Equal Employment Opportunity Commission
 - What is EEOC?
 - Its History
 - Its Application in the Fire Service
- Available Training Programs
 - In-service
 - Regional
 - State
 - National
- Personnel Development Programs
 - Need for Physical Fitness
 - Aspects of Firefighter Safety and Survival
 -

Fire Protection Career Opportunities

12

- Public Fire Protection Careers
 - Federal Agencies
 - State Agencies
 - Local Agencies
- Private Fire Protection Careers
 - Industrial
 - Insurance
 - Apparatus and Equipment
 - Fire Protection Systems
- Orientation to College

Public Fire Protection

8

- History of Fire Protection
 - United States Fire Protection Development
 - Social, Political, and Economic Implications of the Fire Problem
 - Major Causes of Fires in the United States
- Fire Losses
 - Deaths and Injuries
 - Property Damage
- Purpose and Scope of Fire Agencies
 - Basic Types of Local Agencies
 - Job Titles, Duties, and Requirements for positions in Fire Agencies
- Defense Planning
 - Built Environment
 - ISO Grading Schedule
 - Master Planning
 - Mutual/Automatic Aid
 - Community Role
 - Wildland / Urban Interface

Public and Private Support Organizations

4

- Types of Organizations
 - National
 - Federal
 - State
 - Local
- Advisory and Regulatory Agencies
 - Public
 - Private
- Private Fire Suppression Organizations
 - Contract Services
 - Industrial Fire Brigades
- Proprietary Services

Chemistry

12

- Characteristics and Behavior of Fire
 - Fire Triangle
 - Fire Tetrahedron
 - Fire Classifications
 - Fire Hazard Properties of Materials
 - Extinguishing Agents and Methods
 - Phases of Fire
 - Methods of Heat Transfer
- Structural Fires
 - Single Family Dwellings
 - Commercial Buildings
 - Wildland Fires
 - Fuel
 - Weather
 - Topography

Fire Department Resources

10

- Department Facilities

- Administrative Offices
 - Dispatch/Communications Centers
 - Fire Stations
 - Training Facilities
- Types of Apparatus and Their Functions
 - Pumpers/Engines
 - General Purposes
 - Basic Equipment
 - Standards for Design and Construction
 - Structural
 - Wildland
 - Aircraft
 - Specialty
 - Aerial Apparatus
 - General Purposes
 - Basic Equipment
 - Standards for Design and Construction
 - Straight Aerial Ladders
 - Articulating Boom
 - Aerial Platform
 - Combination Pumper/Aerial
 - Quad
 - Quint
 - Water Tender
 - General Purposes
 - Basic Equipment
 - Standards for Design and Construction
 - Hazmat Units
 - EMS Units
 - Ambulance
 - Medic Engines/Trucks
 - Squad
 - Bulldozers
 - General Purposes
 - Service Units
 - Air Tankers
 - General Purposes
 - Helicopters
 - General Purposes
 - Strike Teams and Task Forces
 - Water Tenders
 - Rescue
 - Special
- Personal Safety Equipment

Scope of Operations for a Typical Full Service Fire Department

10

- Fire Suppression and Control
 - Residential

- Commercial
- Industrial/Manufacturing
- High Rise
- Wildland
- Aircraft
- Wildland Urban Interface
- Municipal Firefighter in the Wildland
- Emergency Medical Services (EMS)
 - Policies and Procedures
 - Authority
 - EMS Response Levels
 - Basic Life Support (BLS)
 - Limited Advanced Life Support (LALS)
 - Advance Life Support (ALS)
- Rescue and Extrication
 - Vehicle Extrication
 - Urban Search and Rescue (USAR)
 - High Angel Rescue
 - Swift Water Rescue
 - Mountain Search and Rescue
- Hazardous Materials Emergency Response (Hazmat)
 - Levels of Response
 - First Responder-Awareness
 - First Responder-Operations
 - Hazmat Technician/Specialist
- Fire Prevention
 - Uniform Fire Code (UFC)
 - Uniform Building Code (UBC)
 - California Administrative Code Title 19
 - California Administrative Code Title 24
 - Adopting a Code
 - Concept of Pre-Emption
- Training
- Administration
- Non-Emergency Operations
 - Fire Station Daily Activities/Routine
 - Apparatus and Equipment Maintenance
 - Support Services
 -

Emergency Operations

4

- Personnel
 - Ranks and Positions
 - Duties of Ranks and Positions
 - Shift Schedules
 - Fire Company Defined
 - Common Company Staffing Levels
 - Types of Volunteer Departments
 - Combination Paid/Volunteer Departments
- Alarm System
- Standard Operating Procedures

Fire Prevention

20

- Personnel and Positions
- Responsibilities of the Fire Prevention Bureau
 - Fire Inspection Services
 - Company Inspection Programs
 - Fire Pre-Plan Inspection Project
 - General Inspections
 - Night Inspections
 - Target Hazard Inspections
 - Seasonal Inspections
 - Hazardous Materials Facilities
 - In Progress Inspections
 - Records and Reports
 - Investigations
 - Plan Review
 - Hazard Abatement
 - Public Education/Public Information
 - Enforcement
 - Stop Work Orders
 - Water System Analysis
 - Investigation of Fire Cause and Determination
 - Working with the Building Industry
 - Working with Other Regulatory Agencies
 - Fire Information Reporting Systems
- Fire Data Collection and Analysis

Training

10

- Personnel and Positions
- Responsibilities of the Training Unit
 - Skill Development and Maintenance
- Performance Standards
- Specialized Training Needs
 - Company Officers
 - Chief Officers
 - Driver/Pump Operator
 - Paramedic
 - Fire Investigators
 - Hazmat Technician/Specialist
 - Training Personnel
 - Prevention Personnel
 - Pre-Fire Planning
- California State Fire Marshal Training Program
- California Department of Forestry
- California Specialized Training Institute
- National Fire Academy

Administrative Services

8

Personnel and Positions

- Payroll
 - Time Accounting

- Acting Time Adjustments
- Overtime Adjustments
- Step/Merit Adjustments
- FLSA Adjustments
- Vacation Time Tracking
- Sick Leave Tracking
- Administrative Leave Tracking
- Finance
 - Requisitions
 - Bid Specifications and Processes
 - Stock Inventories
 - Supply Distribution
 - Budget Development
- Personnel
 - Job Descriptions
 - Entrance Examinations
 - Promotional Examinations
 - Background Checks
 - Psychological Screening
 - Probationary Tracking
 - Routine Performance Evaluation
 - Affirmative Action
 - Labor Negotiations
 - Memoranda of Understanding
 - Labor Contracts
 - Disciplinary Actions
- Other Functions
 - Intra-and Intergovernmental Relationships Communication
 - Management Cycle
 - Management by Objectives
- Internal and External Influences
 - Fire Service Labor Organizations
 - Health and Safety Regulations
 - Equal Employment Opportunity and Affirmative Action Programs
 - California Fire Fighter Joint Apprenticeship Program
 - Political Bodies
 - Professional Associations
 - California State Firefighters Association
 - International Association of Firefighters
 - California Professional Firefighters
 - California Fire Chiefs Association
 - Various County and Regional Groups in Training Prevention, Investigation
- Computer Applications

Codes and Ordinances

8

- Federal, State and Local
 - Kinds of Codes
 - Purpose of Codes
 - Contents of Codes
- Responsibility for Enforcement

- Relationship of Codes and Standards
- Relationship of Federal, State, and Local Regulations

Fire Protection Systems and Equipment 6

- Public and Private Systems
 - Water Supplies
 - Suppression Systems
 - Detection and alarm Systems
 - Special Hazard Systems
- Extinguishing Systems

Emergency Incident Management 8

- Introduction to Strategy Development
- Relationship of Strategy to Tactics
- Command System (ICS)

Communicable Disease 4

Employability Research and Portfolio 8

- Development
 - Application Form
 - Resume
 - Thank you letter
 - Interview Questions
 - Certifications
 - Motivation
 - Communications
 - Scheduling
 - Job Search

Total Classroom Hours 140

Project Hours—mandatory community projects
to be completed during the semester 40

Total Hours **180**

STANDARDS

(FS C 2.3, W&OEL 2.3, L&S 2.5, 2.6, T 4.1, 4.3, PS&CT 5.1, 5.3, H&S 6.1, 6.3, 6.4, R&F 7.1, 7.2, 7.3, 7.4, E&LR 8.1,8.3, L&T 9.1, 9.3, 9.5, 9.6, TK&S 10.4)

(PS C 1.2, 1.5, 1.6, 2.1, 2.2, 2.3, 5.1, 5.2, 8.1, 9.1, 9.2)

(CW1.3, 1.6, 2.6 b, c, LS 1.8 b, e, 2.4 a, b, 6.1, 6.3, 6.4)

CAREER PREPARATION STANDARDS:

- A. PERSONAL SKILLS** - Students will understand how personal skill development affects their employability. This skill includes positive attitudes, self-confidence, honesty, responsibility, initiative, self-discipline, personal hygiene, time management, and the capacity for lifelong learning.
1. Demonstrate an understanding of classroom policies and procedures.
 2. Discuss importance of the following personal skills in the business environment:
 - a. positive attitude
 - b. self-confidence
 - c. honesty
 - d. perseverance
 - e. self-management/work ethic
 - f. pride in product/work
 - g. dependability
 3. Identify acceptable work attire.
 4. Establish goals for self-improvement and further education/training.
 5. Prioritize tasks and meet deadlines.
 6. Understand the importance of initiative and leadership.
 7. Understand the importance of lifelong learning in a world of constantly changing technology.
- B. INTERPERSONAL SKILLS** - Students will understand key concepts on group dynamics, conflict resolution, and negotiation. This skill includes the ability to work cooperatively, accept supervision, assume leadership roles, and show respect for others. This standard includes an understanding of sexual harassment laws and an appreciation of cultural diversity in the workplace.
1. Identify and discuss behaviors of an effective team.
 2. Explain the central importance of mutual respect in the workplace relations.
 3. Discuss and demonstrate strategies for conflict resolution and negotiation, and explain their importance within the business environment.
 4. Understand laws that apply to sexual harassment in the workplace, and identify tactics for handling harassment situations.
 5. Work cooperatively, share responsibilities, accept supervision and assume leadership roles.
 6. Demonstrate cooperative working relationships and proper etiquette across gender and cultural groups.
- C. THINKING AND PROBLEM-SOLVING SKILLS** - Students will exhibit critical and creative thinking skills, logical reasoning, and problem-solving. These skills include applying basic skills in order to calculate, estimate, measure; identify, locate, and organize information/data; interpret and follow directions from manuals, labels, and other sources; analyze and evaluate information and solutions.
1. Recognize the importance of good academic skills and implement a plan for self-improvement as needed.
 2. Read, write, and give directions.
 3. Exhibit critical and creative thinking skills and logical reasoning skills, and employ these skills for problem solving.
 - a. Work as a team member in solving problems.
 - b. Diagnose the problem, its urgency, and its causes.
 - c. Identify alternatives and their consequences.
 - d. Explore possible solutions.
 - e. Compare/contrast the advantages and disadvantages of alternatives.
 - f. Determine appropriate action(s).
 - g. Implement action(s).
 - h. Evaluate results of action(s) taken.

- D. **COMMUNICATION SKILLS** - Students will understand principles of effective communication. This standard includes effective oral and written communication, listening skills, following and giving directions, requesting and giving information, asking questions.
1. Use communication concepts in application of skills, techniques, and operations.
 - a. Prepare written material.
 - b. Analyze written material.
 2. Understand and implement written instructions, from technical manuals, written communications, and reference books.
 3. Present a positive image through verbal and nonverbal communication, and understand the power of body language in communication.
 4. Demonstrate active listening through oral and written feedback.
 5. Give and receive feedback.
 6. Demonstrate assertive communications (both oral and written).
 7. Demonstrate proper etiquette in workplace communications, including an awareness of requisites for international communications (languages, customs, time zones, currency and exchange rates).
 8. Demonstrate writing/editing skills as follows:
 - a. Write, proofread, and edit work.
 - b. Use correct grammar, punctuation, capitalization, vocabulary, and spelling.
 - c. Select and use appropriate forms of technology for communication.
 9. Exhibit a proficiency in the use of reference books.
 10. Research, compose, and orally present information for a variety of business situations utilizing appropriate technology.
- E. **OCCUPATIONAL SAFETY** - Students will understand occupational safety issues, including the avoidance of physical hazards in the work environment. This includes the safe operation of equipment, proper handling of hazardous materials, appropriate attire and safety accessories, avoidance of physical injuries, interpretation of warning and hazard signs and terminology, and following and understanding safety-related directions.
1. Discuss and implement good safety practices, including the following (if applicable to course):
 - a. personal
 - b. lab
 - c. fire
 - d. electrical
 - e. equipment
 - f. tools
 - g. interpretation of Material Safety Data Sheets (MSDSs)
 - h. Environmental Protection Agency (EPA)
 - i. Occupational Safety and Health Administration (OSHA)
 - j. American Red Cross Standards (ARC)
 - k. Networking Safety Standards
 2. Apply sound ergonomic principles in organizing one's work space.
- F. **EMPLOYMENT LITERACY** - Students will understand career paths and strategies for obtaining employment within their chosen field. This includes traditional job preparation skills, such as resumes, application forms, cover letters, sources of employment information, and interviewing skills, but also includes an overview of the industry and an understanding of labor market trends.
1. Explore career opportunities and projected trends; investigate required education, training and experience; and develop an individual education plan.
 2. Identify steps for setting goals and writing personal goals and objectives.
 3. Examine aptitudes related to career options; relate personal characteristics and interests to educational and occupational opportunities.
 4. Develop a career portfolio, including the following documents:
 - a. job application

- b. resume(s)
 - c. appropriate cover and follow-up correspondence
5. Identify and demonstrate effective interviewing techniques.
- G. **TECHNOLOGY LITERACY** - Students will understand and adapt to changing technology by identifying, learning, and applying new skills to improve job performance. Students should understand the role of technology in their chosen field and should be able to use all appropriate technology. Students should also feel confident in their ability to learn new technology by generalizing from what they know, adapting skills to new situations, and identifying and using sources of information and of further learning.
- 1. Demonstrate the ability to use personal computers for loading and retrieving data, information gathering, measurements, and writing.
 - 2. Identify the characteristics and explain the importance of adapting to changes, being flexible, and evaluating goals when working in the industry.
 - 3. Understand the importance of lifelong learning in adapting to changing technology.
- H. **IMPORTANCE OF ETHICS** – Students will understand proper ethics in the workplace.
- 1. Discuss social and ethical responsibilities in the industry.
 - 2. Demonstrate ethical choices in workplace situations.