

**FIRE 69 Course Outline as of Fall 2021****CATALOG INFORMATION**

Dept and Nbr: FIRE 69 Title: INTERMED WILDLAND FIRE

Full Title: S-290 Intermediate Wildland Fire Behavior

Last Reviewed: 2/22/2021

Units	Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	2.00	Lecture Scheduled	17.50	2	Lecture Scheduled 35.00
Minimum	2.00	Lab Scheduled	0	2	Lab Scheduled 0
		Contact DHR	0		Contact DHR 0
		Contact Total	17.50		Contact Total 35.00
		Non-contact DHR	0		Non-contact DHR 0

Total Out of Class Hours: 70.00

Total Student Learning Hours: 105.00

Title 5 Category: AA Degree Applicable

Grading: P/NP Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: FIRE 219

**Catalog Description:**

An intermediate course designed to provide the student with wildland fire behavior knowledge applicable for safe and effective wildland fire management activities. Upon successful completion, students will be awarded a S-290 certificate from the State Board of Fire Services.

**Prerequisites/Corequisites:**

Must complete FIRE 71 or equivalent

**Recommended Preparation:****Limits on Enrollment:**

S-190 or equivalent

**Schedule of Classes Information:**

Description: An intermediate course designed to provide the student with wildland fire behavior knowledge applicable for safe and effective wildland fire management activities. Upon successful completion, students will be awarded a S-290 certificate from the State Board of Fire Services. (P/NP Only)

Prerequisites/Corequisites: Must complete FIRE 71 or equivalent

Recommended:

Limits on Enrollment: S-190 or equivalent

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

**AS Degree:**      **Area**      Effective:      Inactive:

**CSU GE:**      **Transfer Area**      Effective:      Inactive:

**IGETC:**      **Transfer Area**      Effective:      Inactive:

**CSU Transfer:** Transferable      Effective:      Spring 2020      Inactive:

**UC Transfer:**      Effective:      Inactive:

### **CID:**

#### **Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Describe the characteristics and interaction of fuels, weather, and topography on wildland fire behavior, fireline tactics, and safety.
2. Describe the causes of extreme fire behavior (long range spotting, crowning, and firewhirls) developing due to weather, fuels, and/or topography.
3. Interpret, document, and apply wildland fire behavior and weather information.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Identify the various components of the fire environment.
2. Describe the influence of topography on fire behavior.
3. Describe the types and characteristics of fuels and their influence on fire behavior.
4. Describe the different weather process in the atmosphere that influence fire behavior.
5. Describe the influence of temperature and humidity on fire behavior and their relationships with each other.
6. Describe the factors that affect atmospheric stability and their relationships with each other.
7. Describe the factors that affect wind conditions and the influence they can have on wildland fire behavior.
8. Identify the types and uses of products available to observe and predict weather.
9. Describe the importance and frequency of conducting weather observations.
10. Demonstrate the correct use of a belt weather kit.
11. Describe the moisture thresholds and weather factors affecting the various fuel types.
12. Describe the factors that contribute to and the characteristics of extreme fire behavior.
13. Demonstrate the ability to gauge fire behavior and use it to guide fire line decisions.

### **Topics and Scope:**

## I. The Fire Environment

- A. Components of wildland fire environment
- B. Methods of heat transfer
- C. Methods of mass transport of firebrands on wildland fire
- D. Relationship between flame height/length and relationship to fireline intensity
- E. Primary environmental factors affecting ignition, fire intensity, and rate of spread
- F. Relationship between intensities and their environments
- G. Behavior of wildland fires using standard fire behavior terminology

## II. Topographic Influences on Wildland Fire Behavior

- A. Standard features of a topographic map
- B. Topography
  - 1. How it affects fuels and their availability for combustion
  - 2. How it affects direction and rate of spread
- C. How changes in fuels and topography can provide full and partial barriers
- D. Slope percent - How it can be determined or estimated in the field

## III. Fuels

- A. Fuel characteristics
- B. Four dead fuel timelag categories used to classify fuels
- C. Fuel Model Concept

## IV. Basic Weather Processes

- A. Structure and composition of the atmosphere
- B. Define weather and list its elements
- C. Sun-Earth radiation budget and Earth's heat balance
- D. Factors affecting temperature
- E. Greenhouse Effect
- F. Temperature lag and their effects

## V. Temperature and Humidity Relationships

- A. Temperature Definitions, Characteristics and Variations
- B. Effects of Variables

## VI. Atmospheric Stability

- A. Relationship among atmospheric pressure, temperature, density and volume
- B. Temperature lapse rate
- C. Effects of atmospheric stability
- D. Types of temperature inversions, lifting processes
- E. Elements of a thunderstorm
- F. Visual indicators to describe stability of the atmosphere
- G. Principles of Cloud Groups

## VII. Wind Systems

- A. Wind definitions and effects
  - 1. General winds
  - 2. Local winds
  - 3. Typical diurnal slope and valley wind patterns
  - 4. Critical winds and their impact
- B. Ways in which topography alters wind patterns
- C. Calculations for wind speed

## VIII. Keeping Current with the Weather

- A. Types, purpose and elements of Predictive Service Products
- B. Types purpose and elements of National Weather Service Products
- C. Importance of Incident Meteorologists (IMET) and Fire Behavior Analysis (FBAN)

## IX. Observing the Weather

- A. When, how often and where to take weather observations
- B. Importance of field observers

- C. Use and maintenance of belt weather kit
- X. Fuel Moisture
  - A. Definitions, methods, and relationships of live fuel
  - B. Effect of precipitation and soil moisture
  - C. Timelag concept and categories
  - D. Moisture of extinction
- XI. Extreme Wildland Fire Behavior
  - A. Common denominators of fire behavior on tragedy wildland fires
  - B. Extreme fire behavior characteristics
  - C. Crown fire development
  - D. Factors that contribute to spotting problem
  - E. Probability of ignition
  - F. Firewhirls, wind-driven and plume dominated fires
- XII. Gauging Fire Behavior and Guiding Fireline Decisions
  - A. Safety and suppression decisions
  - B. Calculating the size of safety zones
  - C. Changes in fire behavior effecting firefighter safety, identifying the “next big change”
  - D. Fire behavior prediction tools

**Assignment:**

1. Pre-course reading and writing assignments and pre-course test
2. Completion of Field Incident Weather Report
3. Reading 20-30 pages between class sessions
4. Individual activities (2 - 3)
5. Group activities (2 - 3)
6. Written homework assignments (3 - 4)
7. Quizzes (2 - 3)
8. Summative exam

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Writing assignments, Field Incident Weather Report, individual and group activities

Writing  
10 - 15%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments, group activities

Problem solving  
5 - 10%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Individual and group activity skills demonstrations

Skill Demonstrations  
5 - 15%

**Exams:** All forms of formal testing, other than skill performance exams.

Pre-course test, quizzes, summative exam

Exams  
60 - 70%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Pre-course reading assignment, attendance and participation

Other Category  
5 - 10%

**Representative Textbooks and Materials:**

- S-290 Student workbook. National Wildfire Coordinating Group. 2014 (classic)
- S-290 Student CD-ROM. National Wildfire Coordinating Group. 2014 (classic)
- National Fire Equipment System (NFES) 2894 Flame Field Guide. NFES. 2012 (classic)
- NFES 2165 Fireline Handbook Appendix B. NFES. 2014 (classic)
- NFES 1574 Aids for Determining Fuel Models. NFES. 2012 (classic)
- NFES 1077 Incident Response Pocket Guide. NFES. 2018