

Wildfire Science and the Urban Interface
California State University, San Marcos

Course Outline

FIRE 105
FIRE SCIENCE

COURSE DESCRIPTION

Covers fire conditions, tactics, and strategies to mitigate fire and fire behaviors, emphasizing wildland and urban interface fires. Discusses fire chemistry including oxidizers, chemical process of combustion, and properties of solid, liquid, and gas fuels. Reviews basic fire chemistry for hazardous materials, identification, reactivity, and health/safety implications. Explores issues related to pyrolysis, the properties of the states of matter, sources of energy for fires, and the properties of heat and temperature.

REQUIRED MATERIALS

We will use the textbook Gann, R. and R. Friedman. 2015. Principles of Fire Behavior and Combustion (4th Edition). Jones and Bartlett Learning and National Fire Protection Association. 294 Pages. The book was selected because it provides readers with a thorough understanding of the chemical and physical properties of flammable materials and fire, the combustion process, and the latest in suppression and extinguishment. The *Fourth Edition* of this time-tested resource is the most current and accurate source of fire behavior information available to fire science students. The textbook also provides complete coverage of the National Fire Academy's Fire and Emergency Services Higher Education (FESHE) Fire Behavior and Combustion model curriculum, in a clear, reader-friendly style to help simplify even the most challenging subject matter.

Supplemental readings may be provided throughout the semester, either uploaded to the course website, provided by a link to online materials, and/or emailed directly to students.

COURSE WEBSITE

This course is a fully-online course. As such, we will rely on the Cougar Courses course management software for all course interactions, materials, assignments, discussions, and exams. Recorded lectures, course notes, assignments, supplemental readings, and exams will all be found there. There will also be an online forum for discussion boards and group conversations. Once you have successfully enrolled in the class you will have access to the course website at: <http://cc.csusm.edu>. Log in with your email user name and the same password as your email account.

GRADING POLICY

Your grade will be based on performance on two exams (one midterm and one final), quizzes, assignments, and participation. While we want each student to achieve the highest grade possible in the course, please remember that long-standing policy considers a grade of A to be indicative of outstanding achievement; available only for the highest accomplishment, while a grade of B indicates a praiseworthy performance; definitely above average. Of course a C is considered average. This course does not use particular numerical scores that must be achieved to get a specific letter grade. Instead, letter grades will be assigned to scores after each assignment on the basis of the class average and our judgment regarding class performance.

Most of your grade will be based on exams. We encourage you to keep up with the course pace, and develop virtual study groups with other members of the class. Discussion and interaction can be an important part of understanding the topic. Your grades will be posted on the course website as they become available, for assessment of your progress throughout the semester. Please be sure to contact the instructor early on if you are having any difficulty in the course.

Exams and quizzes: To understand the chemistry and physics of fire, you need to commit basic factual information to memory, and apply concepts to new problems. Each exam will test your ability to apply course information and materials to questions and case studies to solve and communicate answers to real-world problems. Assessments will be open book and notes. The midterm and final exam will be comprehensive, covering all information up to that point in the course. Open book exams are not easy; you will not have time to look up everything you need to know. Exams will only be offered at a specific time. Also exams are timed, meaning that students will have to complete the exam in the period allotted, with the site automatically shutting off after time expires. *Please note: final exam will occur during week eight.*

To make sure that everyone is keeping up with the readings and lectures, periodic quizzes will be given throughout the semester, mostly to judge your understanding of the subject matter, and to encourage timely preparation. Like exams, quizzes will be timed, and you will be automatically shut off after time expires.

Assignments: You will provide critical assessment and periodic assignments for this class that will teach you to apply the techniques and information you are learning. Details of each assignment will be covered in separate instructions. In general, assignments are designed to allow us to evaluate your critical thinking skills, problem solving abilities, and original thought. We will also want to ensure that written materials are of the highest quality and standard. To prepare you for assignments, textbook, online readings and/or other supplemental materials may be provided. These materials cover the concepts pertinent to the assignment.

Participation. Topics discussed in this course may be unfamiliar, albeit extremely important for your development as scientists and wildfire/WUI professionals. Regardless of whether you could conceivably pass the class without participating with the instructor or other students, every student learns more if he or she actively engages with the material, which you cannot do if you don't participate. Therefore, participation points will

be based on attending online forums and discussions along with real-time discussion as appropriate.

Final Grades will be calculated using the following:

Assignments	20 points	A = 100-95	C- = 73-70
Quizzes	20 points	A- = 90-94	D+ = 69-67
Participation	10 points	B+ = 89-87	D = 66-64
Midterm Exam	50 points	B = 86-84	D- = 63-60
Final Exam	100 points	B- = 83-80	F < 59
		C+ = 79-77	
TOTAL	200 points	C = 76-74	

Notes on Grading

Please check the grade for each assessment for errors. Any concerns (errors, disputes) be brought to our attention within **2 weeks**. Please double check your grade against the posted grades recorded on the website.

CLASS POLICIES

Getting help: Students often struggle with various concepts, particularly during the early stages of a class. If you are having difficulty, there are several ways to get help:

- Come to virtual office hours. In addition to my posted office hours, you are welcome to set up a meeting by appointment. Office hours are greatly under-used by students at this campus, don't be shy about making use of them!
- Review sessions. Before each exam, I will offer a review session and summary materials that can assist in studying and preparing.

Email notification: If I need to e-mail announcements about the class, I will use your CSUSM account. If you do not regularly monitor your CSUSM e-mail, please set up a forward from your campus e-mail to whatever account you regularly use.

Academic dishonesty: Academic misconduct has rarely been a problem, and warning you about the consequences may seem unnecessary and perhaps even offensive. The University takes standards of integrity very seriously. We are very strict with regard to cheating and plagiarism, and will respond accordingly. Please review the information on students' rights and responsibilities

Any work you submit for grading must represent your own thinking, and must be in your own words. Any cheating or plagiarism that is detected will be reported to the Dean of Students. You are expected to know what plagiarism is – refer to <https://microsites.csusm.edu/plagiarism-tutorial/> for a tutorial on plagiarism (including “unintentional” plagiarism) and how to avoid them. The instructor reserves the right to apply appropriate penalties for cases of academic dishonesty detected, up to and including assigning an F for the class. All cases of academic dishonesty will be reported to the Dean of Students.

Making up missed work: This class involves a great deal of online interaction and work. As a fully online course, the internet becomes the virtual classroom. It is critically important that students put in the time to view lectures, attend discussion sessions (as appropriate), and review all course materials. Missed assignments, exams or quizzes will receive zeros, unless arrangements are made in advance, or unless documentation of a serious and compelling reason is presented for the absence.

Disabled student services: Students with disabilities who require academic accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disabled Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Students authorized by DSS to receive accommodations should meet with me during my virtual office hours or in a more private setting in order to ensure your privacy.

All-University writing requirement: As a three unit course, each student will complete a rigorous series of written assessments that will encompass at least 2,500 words (approximately 10 pages). The student will be responsible for original work, ideas, and concepts, ensuring that all written materials submitted are of the highest quality and standard. Assessment of this material will cover spelling and grammar, content, clarity, and organization. Evaluations will also address critical thinking skills, problem solving, and original thought.

LEARNING OUTCOMES

After taking this course you should be able to:

- Apply basic concepts from this, and other scientific disciplines and courses, to broad issues in wildfires and the wildland urban interface (WUI)
- Understand how chemistry and physics informs risk assessment, decision making on the fireground.
- Apply experiences from your life and experience with fire to the chemical and physical processes of ignition and combustion
- Apply an understanding of fire chemistry and physics to appropriate practices, tools, tactics, and strategies to avoid, minimize, and mitigate the risks of fires in the wildland and wildland urban interface
- Apply information and practice problems incorporated throughout the text to help bridge the gap between theory and application on the fireground.

RECOMMENDATIONS FOR STUDENT SUCCESS

You will find that the content in this class is familiar to you, but can certainly be challenging. However, the coursework will reinforce the principles of the scientific process, critical thinking, and problem solving. Students who are successful in this class are those that employ the following practices.

- Dedicate yourself to learning the course material – read and review.
- Never let yourself get behind on the materials or assignments.
- Use the help that is offered (instructor office hours, review sessions, and discussion boards).

- Study for exams! While exams are open book/notes, you really need to know the materials; you will not have enough time to go through all your notes and materials to answer questions.
- Turn in all assignments quizzes, etc. – small points add up quickly and are very destructive of your grades
- Work in study groups. Or study alone. But whatever you do, study!

CLASS SCHEDULE

Unit 1	Chemistry and Physics Basics
Unit 2	Chemical and Physical Process of Combustion
Unit 3	Physical and Chemical Foundations of Tactics and Strategies
Unit 4	Properties of Fuels and States of Matter / MIDTERM
Unit 5	Fire behavior, convection, and radiation
Unit 6	Properties of Smoke
Unit 7	Principles of Fire Protection Chemistry
Unit 8	Hazardous Materials and Pollutants / FINAL EXAM