

Basic Course Information

Semester:	Fall	Instructor Name:	Kenneth Herbert
Course Title & #:	Fire 104 Fire Behavior and Combustion	Email:	Kenneth.herbert@imperial.edu
CRN #:	11124	Webpage (optional):	
Classroom:	3211	Office #:	
Class Dates:	14 Aug 2017- 8 Dec 2017	Office Hours:	varies
Class Days:	Tuesday	Office Phone #:	760-545-4517
Class Times:	630-940pm	Emergency Contact:	
Units:	3		

Course Description

This course provides theory 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 will be covered. This is one of six CORE courses required for an associate degree in Fire Technology. (CSU)

Course Prerequisite(s) and/or Corequisite(s)

None

Student Learning Outcomes

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. Define basic terms and concepts related to fire behavior and chemistry.(ILO2),
2. Analyze physical conditions which determine states of matter and influence fire behavior. (ILO2)
3. Demonstrate how to recall physical and chemical properties of fire.(ILO4)

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. Demonstrate a working knowledge of matter, energy, the atom, chemical symbols, molecules, energy and work, forms of energy, transformation of energy, and the laws of energy with an overall exam score of 70%.
2. Demonstrate a working knowledge of units of measurements, including international (SI) systems of

measurement and English units of measurement with an overall exam score of 70%.

3. Demonstrate a working knowledge of chemical reactions, including physical states of matter, compounds and mixtures, solutions and solvents, and process of reactions with an overall exam score of 70%.

4. Demonstrate a working knowledge of fire and the physical world, including the characteristics of fire, solids, liquids, and gases with an overall exam score of 70%.

5. Demonstrate a working knowledge of heat and its effects, including the production and measurement of heat and the different kinds of heat with an overall exam score of 70%.

6. Demonstrate a working knowledge of the properties of solid materials, including common combustible solids, plastic and polymers, combustible metals and dust with an overall exam score of 70%.

7. Demonstrate a working knowledge of common flammable liquids and gases, including fire characteristics, general properties of gases, the gas laws, classification of gases, and compressed gases with an overall exam score of 70%.

8. Demonstrate a working knowledge of fire extinguishment, including the combustion process, and the character of flame with an overall exam score of 70%.

9. Demonstrate a working knowledge of the classification of fire and extinguishing agents with an overall exam score of 70%.

10. Demonstrate a working knowledge of gas and halon extinguishing agents with an overall exam score of 70%.

11. Demonstrate a working knowledge of the Department of Transportation hazard classes with an overall exam score of 70%.

12. Demonstrate a working knowledge of placarding with an overall exam score of 70%.

13. Demonstrate a working knowledge of labeling with an overall exam score of 70%.

14. Demonstrate a working knowledge of the hazards of chemicals with an overall exam score of 70%.

15. Participate in the following and receive an overall score of 70%: A. Student will analyze a typical transportation load of hazardous materials, and determine the proper placarding, and determine incompatible loading B. Student will define, in writing, the physical properties of dangerous chemicals. C. Student will explain, analyze, compare and present the theory of fire and compare the applications of various extinguishment techniques.

Textbooks & Other Resources or Links

Ray Shakelford (2009). *Fire Behavior and Combustion Process* (1/e). Delmar Cengage Learning. ISBN: 978-1401880163

Course Requirements and Instructional Methods

In addition to in course work the student must complete a written assignment and prepare a presentation. Canvas will be utilized for all test, quizzes, and to post supplemental information. Students must have access to Canvas.

Out of Class Assignments: The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.

Course Grading Based on Course Objectives

Your course grade will be based on the following activities:

• Participation	80 points	12.5%
• Quizzes	80 points	12.5%
• Presentation	80 points	12.5%
• Written Assignment	100 points	15.625%
• Midterm Exam	100 points	15.625%
• Final Exam	200 points	31.25%
• TOTAL	640 points	100%

Participation

- Active participation will enhance the course delivery. Every student is expected to be prepared to discuss the topics covered.

Quizzes

- A quiz shall be administered for each class session chapter.
- Quizzes shall be due prior to the start of the next class. Late quizzes will not receive credit.
- Ten (10) points possible for each quiz.

Presentation

- Each student will present a topic as assigned by the instructor. The presentation time frame will be 10 minutes. Details for completing the assignment will be provided.

Written Assignment

- A three to five page paper will be required to be completed by the 11th class meeting. Details for completing the assignment will be provided.

Final Exam

- A final exam will be given that covers the stated course objectives.

Your final grade will be determined based on the following percentages:

- A 100 – 90
- B 89 – 80
- C 79 – 70
- D 69 – 60
- F 59 – 0

Attendance

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See [General Catalog](#) for details.
- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.

- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as ‘excused’ absences.

Classroom Etiquette

- **Electronic Devices:** Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- **Food and Drink** are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- **Disruptive Students:** Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the [General Catalog](#).
- **Children in the classroom:** Due to college rules and state laws, only students enrolled in the class may attend; children are not allowed.

Online Netiquette

- What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word. Basically, netiquette is a set of rules for behaving properly online.
- Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others’ opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

Academic Honesty

Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another’s work and recognize the important of acknowledging and safeguarding intellectual property.

There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

- **Plagiarism** is taking and presenting as one’s own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to “cite a source” correctly, you must ask for help.
- **Cheating** is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary

action. Please refer to the [General Catalog](#) for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment; (c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

Additional Student Services

Imperial Valley College offers various services in support of student success. The following are some of the services available for students. Please speak to your instructor about additional services which may be available.

- **CANVAS LMS.** Canvas is Imperial Valley College's main Learning Management System. To log onto Canvas, use this link: [Canvas Student Login](#). The [Canvas Student Guides Site](#) provides a variety of support available to students 24 hours per day. Additionally, a 24/7 Canvas Support Hotline is available for students to use: 877-893-9853.
- **Learning Services.** There are several learning labs on campus to assist students through the use of computers and tutors. Please consult your [Campus Map](#) for the [Math Lab](#); [Reading, Writing & Language Labs](#); and the [Study Skills Center](#).
- **Library Services.** There is more to our library than just books. You have access to tutors in the [Study Skills Center](#), study rooms for small groups, and online access to a wealth of resources.

Disabled Student Programs and Services (DSPS)

Any student with a documented disability who may need educational accommodations should notify the instructor or the [Disabled Student Programs and Services](#) (DSP&S) office as soon as possible. The DSP&S office is located in Building 2100, telephone 760-355-6313. Please contact them if you feel you need to be evaluated for educational accommodations.

Student Counseling and Health Services

Students have counseling and health services available, provided by the pre-paid Student Health Fee.

- **Student Health Center.** A Student Health Nurse is available on campus. In addition, Pioneers Memorial Healthcare District provide basic health services for students, such as first aid and care for minor illnesses. Contact the IVC [Student Health Center](#) at 760-355-6128 in Room 1536 for more information.
- **Mental Health Counseling Services.** Short-term individual, couples, family and group counseling services are available for currently enrolled students. Services are provided in a confidential, supportive, and culturally sensitive environment. Please contact the IVC Mental Health Counseling Services at 760-355-6310 or in the building 1536 for appointments or more information..

Veteran's Center

The mission of the [IVC Military and Veteran Success Center](#) is to provide a holistic approach to serving military/veteran students on three key areas: 1) Academics, 2) Health and Wellness, and 3) Camaraderie; to serve as a central hub that connects military/veteran students, as well as their families, to campus and community resources. Their goal is to ensure a seamless transition from military to civilian life. The Center is located in Building 600 (Office 624), telephone 760-355-6141.

Extended Opportunity Program and Services (EOPS)

The Extended Opportunity Program and Services (EOPS) offers services such as priority registration, personal/academic counseling, tutoring, book vouchers, and community referrals to qualifying low-income students. EOPS is composed of a group of professionals ready to assist you with the resolution of both academic and personal issues. Our staff is set up to understand the problems of our culturally diverse population and strives to meet student needs that are as diverse as our student population.

Also under the umbrella of EOPS our CARE (Cooperative Agency Resources for Education) Program for single parents is specifically designed to provide support services and assist with the resolution of issues that are particular to this population. Students that are single parents receiving TANF/Cash Aid assistance may qualify for our CARE program, for additional information on CARE please contact Lourdes Mercado, 760-355- 6448, lourdes.mercado@imperial.edu.

EOPS provides additional support and services that may identify with one of the following experiences:

- Current and former foster youth students that were in the foster care system at any point in their lives
- Students experiencing homelessness
- Formerly incarcerated students

To apply for EOPS and for additional information on EOPS services, please contact Alexis Ayala, 760-355-5713, alexis.ayala@imperial.edu.

Student Equity Program

- The Student Equity Program strives to improve Imperial Valley College's success outcomes, particularly for students who have been historically underrepresented and underserved. The college identifies strategies to monitor and address equity issues, making efforts to mitigate any disproportionate impact on student success and achievement. Our institutional data provides insight surrounding student populations who historically, are not fully represented. Student Equity addresses disparities and/or disproportionate impact in student success across disaggregated student equity groups including gender, ethnicity, disability status, financial need, Veterans, foster youth, homelessness, and formerly incarcerated students. The Student Equity

Program provides direct supportive services to empower students experiencing insecurities related to food, housing, transportation, textbooks, and shower access. We recognize that students who struggle meeting their basic needs are also at an academic and economic disadvantage, creating barriers to academic success and wellness. We strive to remove barriers that affect IVC students' access to education, degree and certificate completion, successful completion of developmental math and English courses, and the ability to transfer to a university. Contact: 760.355.5736 or 760.355.5733 Building 100.

- The Student Equity Program also houses IVC's Homeless Liaison, who provides direct services, campus, and community referrals to students experiencing homelessness as defined by the McKinney-Vento Act. Contact: 760.355.5736 Building 100.

Student Rights and Responsibilities

Students have the right to experience a positive learning environment and to due process of law. For more information regarding student rights and responsibilities, please refer to the IVC [General Catalog](#).

Information Literacy

Imperial Valley College is dedicated to helping students skillfully discover, evaluate, and use information from all sources. The IVC [Library Department](#) provides numerous [Information Literacy Tutorials](#) to assist students in this endeavor.

Anticipated Class Schedule/Calendar

Date	Time	Subject
8/15	6:30-9:40pm	<p>Fire Behavior and Combustion</p> <ul style="list-style-type: none"> • Introductions • Syllabus Review • Textbook/Handout Review • Fire and Emergency Service Higher Education • Death and Injury Rates
8/22	6:30-9:40pm	<p>I. Introduction</p> <ul style="list-style-type: none"> A. Matter and Energy B. The Atom and its Parts C. Chemical Symbols D. Molecules E. Energy and Work F. Forms of Energy G. Transformation of Energy H. Laws of Energy

<p>8/29</p>	<p>6:30-9:40pm</p>	<p>II. Units of Measurements A. International (SI) Systems of Measurement B. English Units of Measurement</p> <p>III. Chemical Reactions A. Physical States of Matter B. Compounds and Mixtures C. Solutions and Solvents</p>
<p>9/5</p>	<p>6:30-9:40pm</p>	<p>IV. Fire and the Physical World A. Characteristics of Fire B. Characteristics of Solids C. Characteristics of Liquids D. Characteristics of Gases</p>
<p>9/12</p>	<p>6:30-9:40pm</p>	<p>V. Heat and its Effects A. Production and Measurement of Heat B. Different Kinds of Heat D.</p>
<p>9/19</p>	<p>6:30-9:40pm</p>	<p>VI. Properties of Solids Materials A. Common Combustible Solids B. Plastic and Polymers C. Combustible Metals D. Combustible Dust</p>
<p>9/26</p>	<p>6:30-9:40pm</p>	<p>Midterm</p>
<p>10/3</p>	<p>6:30-9:40pm</p>	<p>VII. Common Flammable Liquids and Gases A. General Properties of Gases B. The Gas Laws C. Classification of Gases D. Compressed Gases</p>
<p>10/10</p>	<p>6:30-9:40pm</p>	<p>VIII. Fire Behavior A. Stages of Fire B. Fire Phenomena 1. Flashover 2. Backdraft 3. Rollover 4. Flameover C. Fire Plumes</p>

10/17	6:30-9:40pm	Fire Extinguishment A. The Combustion Process B. The Character of Flame C. Fire Extinguishment
10/24	6:30-9:40pm	Project Presentations Paper Due
11/31	6:30-9:40pm	IX. Extinguishing Agents A. Water B. Foams and Wetting Agents C. Inert Gas Extinguishing Agents D. Halogenated Extinguishing Agents E. Dry Chemical Extinguishing Agents F. Dry Powder Extinguishing Agents
11/7	6:30-9:40pm	Hazards By Classification Types <ul style="list-style-type: none"> • Hazards of Explosives • Hazards of Compressed and Liquefied Gases • Hazards of Flammable and Combustible Liquids
11/14	6:30-9:40	Ventilation
11/21	No class	
11/28	6:30-9:40pm	<ul style="list-style-type: none"> • Hazards of Flammable Solids • Hazards of Oxidizing Agents • Hazards of Poisons • Hazards of Radioactive Substances • Hazards of Corrosives
12/5	6:30-9:40pm	Final

*****Tentative, subject to change without prior notice*****