

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: FFP 2111

COURSE TITLE: Fire Chemistry

PREREQUISITE(S): None

COREQUISITE(S): None

CREDIT HOURS: 3

CONTACT HOURS/WEEK: 3

CONTACT HOUR BREAKDOWN:

Lecture/Discussion: 3

Laboratory:

Other _____:

FACULTY WORKLOAD POINTS: 3

STANDARDIZED CLASS SIZE
ALLOCATION: 25

CATALOG COURSE DESCRIPTION:

This course is designed to provide the student with an understanding of the basic chemistry of hazardous materials, features of matter and energy, forms of matter, chemical formulas of flammable and combustible substances, the nature of chemical bonding, and the principles of chemical reactions in relation to incidents involving fire and/or corrosives. Study involves pyrophoric metals, hypergolics, cryogenics, and pesticides as well as the more common materials and chemicals. Emphasis is placed on methods to recognize hazardous materials in the field. Sources of information relative to safe handling of materials and extinguishing associated fires are studied.

SUGGESTED TEXT(S): Hazardous Materials Chemistry, Delmar, Thomson Learning, Inc., 2001, Bevelacqua, Armando S., 1956

IMPLEMENTATION DATE: Fall Term, 2002 (20031)

REVIEW OR MODIFICATION DATE:

<u>COURSE TOPICS</u>	<u>CONTACT HOURS PER TOPIC</u>
I. Chapter One	7
A. Chemical Structure and Physical Effects	
1. The Structure of Atoms	
2. The Periodic Table	
3. Chemical Bonding	
4. Properties of Matter	
5. Toxicology	
6. Summary	
II. Chapter Two	7
A. Inorganic Compounds	
1. Ionic Bonding	
2. Symbols and Lewis Dot Structures	
3. Binary Compounds	
4. Covalent Bonding	
5. Properties of Ionic and Covalent Compounds	
6. Acid-Base Reactions	
7. Other Hazardous Inorganic Compounds	
8. Combustion	
9. Radiation	
10. Summary	
III. Chapter Three	7
A. Organic Compounds I - Organic Structure	
1. Principles of Bonding	
2. Organic Nomenclature	
3. Kinetic Molecular Theory	
4. Branching and Its Effects on Physical Properties	
5. Summary	
IV. Chapter Four	7
A. Organic Compounds II - Nonpolar Compounds	
1. Alkyl Halides	
2. Amines	
3. Nitrogen Groups	
4. Ethers and Epoxides	
5. Organic Peroxides	
6. Polymers	
7. Branching and Its Effects on Physical Properties	
8. Summary	

COURSE TOPICS (continued)

CONTACT HOURS
PER TOPIC

V.	Chapter Five	7
	A. Organic Compounds III - Polar Compounds	
	1. Alcohols, Phenols, and Their Sulfur Analogs	
	2. Carbonyl Groups	
	3. Organic Acids	
	4. Cyanide Salts	
	5. Branching and Its Effects on Physical Properties	
	6. Chemical Warfare Agents	
	7. Summary	
VI.	Chapter Six	7
	A. Science Officer's Reference Guide	
	1. The Decision Making Process	
	2. Measurements and Conversions	
	3. Environmental Considerations	
	4. Flammable Limits	
	5. Critical Temperature and Pressure	
	6. Volatility	
	7. Toxicological Considerations	
	8. Acid-Base Reactions	
	9. General Monitoring and Detection	
	10. Personal Protective Equipment	
	11. Triage Considerations	
	12. Decontamination	
VII.	Glossary and Acronyms	3

PROGRAM TITLE: Fire Science Technology

COURSE TITLE: Fire Chemistry

CIP NUMBER: 0743.020100

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLE(S):

05.0 DEMONSTRATE KNOWLEDGE OF THE STRATEGIES OF FIRE CONTROL—The student will be able to:

05.02 Define the firefighting strategy necessary for fire control in flammable liquids.

05.03 Define the firefighting strategies necessary for fire control in liquefied petroleum or natural gas

22.0 DEMONSTRATE KNOWLEDGE OF CHEMICAL CONCEPTS- The student will be able to:

22.01 Define the following terms and demonstrate how each relates to emergency situations: (a) vapor pressure, (b) vapor density, (c) ignition temperature (d) flash point, (e) flammable limits, (f) specific gravity, (g) boiling point, (h) reactivity, (i) alkalines, (j) acids, (k) oxidizers.

22.02 Explain the following as defined by an accepted authority: atom, molecule, Ions, atomic and molecular weights, chemical changes, chemical equilibrium, acids, and bases.

26.0 DEMONSTRATE KNOWLEDGE OF HAZARDOUS MATERIALS--The student will be able to:

26.01 Identify the general properties of flammable and combustible liquids.

26.02 Define the basic effects of temperature and pressure on flammable and combustible liquids.

26.03 Define flammable and explosive limits.

26.04 Define specific gravity.

26.05 Define boiling point.

26.06 Define the basic classes of flammable and combustible liquids as defined by NFPA 30, Flammable and Combustible Liquids Code.

26.07 Identify the fire hazards associated with the storage, handling, and use of flammable and combustible liquids.

26.08 Identify the regulations and hazards attendant to the transfer of flammable and combustible liquids.

26.09 Identify the regulations and fire hazards attendant to finishing processes that involve flammable and combustible liquids.

26.10 Identify what conditions constitute possible sources of ignition during storage, handling, and use of flammable and combustible liquids.

26.11 Identify conditions that might be conducive to creating explosive atmospheres in the storage, handling, and use of flammable and combustible liquids.

26.12 Identify conditions associated with the typical storage, handling, and use of flammable and combustible liquids that might be conducive to a BLEVE situation.

26.14 Identify the procedures for investigating flammable or combustible liquid leaks or suspected leaks.

26.39 Identify the regulatory labeling and placarding systems used for flammable and combustible liquids identification.

26.41 Identify which agencies offer assistance in handling flammable and combustible liquids emergencies in the jurisdiction.

26.42 Identify the general properties of compressed and liquefied gases.

LIST PERFORMANCE STANDARD ADDRESSED (CONTINUED)

NUMBER(S):

TITLE(S):

- 26.42 Identify the effects of temperature and pressure as they relate to compressed and liquefied gases.
- 26.43 Define specific gravity, particularly as it relates to compressed and liquefied gases.
- 26.44 Identify the difference between compressed and liquefied gases.
- 26.45 Identify the fire hazards associated with the typical storage, handling, and use of compressed and liquefied gases.
- 26.46 Identify possible ignition sources and fire causes involving compressed and liquefied gases.
- 26.47 Identify the conditions that might be conducive to fire initiation and propagation involving compressed and liquefied gases.
- 26.48 Identify the procedure for investigating flammable gas leaks or suspected leaks.
- 26.53 Identify methods of compressed and liquefied gases leakage control.
- 26.57 Identify fire extinguishments practices and procedures for compressed and liquefied gases.
- 26.60 Identify regulatory labeling and placarding regulations relative to compressed and liquefied gases.
- 26.61 Identify the classifications of explosives. (See NFPA 495, Code for the Manufacture, Transportation, Storage, and Use of Explosive Materials)
- 26.65 Identify regulatory labeling and placarding systems relative to explosives, including fireworks.
- 26.66 Identify the sources from which detailed or technical information on explosives, including fireworks, might be obtained.
- 26.69 Identify the regulatory labeling and placarding systems for various types and quantities of hazardous materials.
- 26.71 Identify sources of detailed and technical information about various hazardous materials.
- 26.72 Identify the characteristics of corrosives and name the more common corrosives.
- 26.73 Identify reactive material characteristics and name the more common reactive materials.
- 26.74 Identify unstable material characteristics and name to more common unstable materials.
- 26.75 Identify toxic material characteristics and name the more common toxic materials.
- 26.76 Identify radioactive material characteristics and name the more common radioactive materials.
- 26.77 Identify oxidizing material characteristics and name the more common oxidizing materials.
- 26.80 Identify combustible metal characteristics and name the more common combustible metals.
- 26.81 Identify combustible dust characteristics and name the more common combustible dusts
- 26.82 Identify the basic fire and explosive characteristics of the various combustible dusts.



NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.

Section 1	SEMESTER CREDIT HOURS (CC): <u>3</u>
COURSE PREFIX AND NUMBER: <u>FFP 2111</u>	CONTACT HOURS (NCC): _____
COURSE TITLE: <u>Fire Chemistry</u>	

Section 2

TYPE OF COURSE: (Click on the box to check all that apply)

<input type="checkbox"/> AA Elective	<input checked="" type="checkbox"/> AS Required Professional Course	<input type="checkbox"/> College Prep
<input type="checkbox"/> AS Professional Elective	<input checked="" type="checkbox"/> AAS Required Professional Course	<input type="checkbox"/> Technical Certificate
<input type="checkbox"/> Other _____	<input type="checkbox"/> PSAV	<input type="checkbox"/> Apprenticeship
<input type="checkbox"/> General Education: (For General Education courses, you must also complete Section 3 and Section 7)		

Section 3 (If applicable)

INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:

<input type="checkbox"/> Communications	<input type="checkbox"/> Social & Behavioral Sciences	<input type="checkbox"/> Mathematics
<input type="checkbox"/> Natural Sciences	<input type="checkbox"/> Humanities	

Section 4

INTELLECTUAL COMPETENCIES:

<input checked="" type="checkbox"/> Reading	<input checked="" type="checkbox"/> Speaking	<input checked="" type="checkbox"/> Critical Analysis	<input checked="" type="checkbox"/> Quantitative Skills	<input checked="" type="checkbox"/> Scientific Method of Inquiry
<input checked="" type="checkbox"/> Writing	<input checked="" type="checkbox"/> Listening	<input type="checkbox"/> Information Literacy	<input type="checkbox"/> Ethical Judgment	<input type="checkbox"/> Working Collaboratively

Section 5	
LEARNING OUTCOMES	METHOD OF ASSESSMENT
• Demonstrate knowledge of the strategies of fire control	Exam
• Define vapor pressure, vapor density, ignition temperature, flashpoint, flammable limits, specific gravity, boiling point, reactivity, alkaline, acids, and oxidizers as it relates to emergency situations	Exam
• Explain atom, molecule, ions, atomic and molecular weights, chemical changes, chemical equilibrium, acids and bases	Exam
• Define classes of flammable and combustible liquids as defined by NFPA 30, Flammable and Combustible Liquids Code.	Exam
• Define flammable and explosive limits	Exam
• Identify conditions associated with the typical storage, handling, and use of flammable and combustible liquids that might be conducive to a BLEVE situation	Exam

Section 5 (Continued)

Section 5		
LEARNING OUTCOMES		METHOD OF ASSESSMENT
•	Identify effects of temperature and pressure as they relate to compressed and liquefied gasses	Exam
•	Identify the classifications of explosives (as defined by NFPA 495, Code for the Manufacturer, Transportation, Storage, and Use of Explosive Materials).	Exam
•	Identify radioactive material characteristics and name the more common radioactive materials	Exam
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Section 6

Name of Person Completing This Form: Dr. Debra Mertz/Kenneth M. Ellison Date: 10/9/2007