COWLEY COLLEGE
& Area Vocational Technical School

COURSE PROCEDURE FOR

Hazardous Materials for First Responders
FIR 5500 3 Credit Hours

Student Level:
This course is open to students on the college level in either the Freshman or Sophomore year.

Catalog Description:

FIR 5500 – Hazardous Materials for First Responders (3 hrs)
This course is designed to meet the learning objectives/performance objectives specified by the National Fire Protection Association (NFPA) standard 472. The course is also designed to prepare the student for the Hazardous Materials Operations-Level certification process. Upon completion of the course, the student will develop competencies to increase understanding and skills in managing hazardous material releases, hazardous material decontamination, and personal protective equipment used during hazardous material incidents.

Prerequisites:
None.

Co-requisites:
FIR5501 Firefighter I

Controlling Purpose:
This course is designed to meet the learning objectives/performance objectives specified by the National Fire Protection Association (NFPA) standard 472. The course is also designed to prepare the student for the Hazardous Materials Operations-Level certification process.

Learner Outcomes:
Upon completion of the course, the student will develop competencies to increase understanding and skills in managing hazardous material releases, hazardous material decontamination, and personal protective equipment used during hazardous material incidents.

Units Outcomes and Clock Hours of Instruction for Core Curriculum:
The following outline defines the minimum core content not including the final examination period. Instructors may add other material as time allows.

Evaluation Key:

A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.

B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.

C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.

D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.

F = Failing, will be computed in GPA and hours attempted.

N = No instruction or training in this area.

UNIT 1: INTRODUCTION TO HAZARDOUS MATERIALS

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies
						Describe the various types of hazardous materials hazards. [NFPA® 472, 4.4.1(3)(c), 5.2.2(3)(a), 5.2.2(8), 5.2.3(1)(a)(iii), 5.2.3(1)(a)(x), 5.2.3(1)(b)(ii-vi), 5.2.3(7), 5.2.3(8)(a-j)]
						Distinguish between hazardous materials incidents and other emergencies. [NFPA® 472, 4.2.1(4)]
						Discuss the roles of Awareness-Level personnel and Operations-Level responders. [NFPA® 472, 4.4.1(2), 5.4.3(1)]
						Describe the various types of hazardous materials hazards. [NFPA® 472, 4.4.1(3)(c), 5.2.2(3)(a), 5.2.2(8), 5.2.3(1)(a)(iii), 5.2.3(1)(a)(x), 5.2.3(1)(b)(ii-vi), 5.2.3(7), 5.2.3(8)(a-j)]
						Explain each of the routes of entry. [NFPA® 472, 4.4.1(3)(d)]
						Describe the U.S., Canadian, and Mexican hazardous materials regulations and definitions. [NFPA® 472, 4.2.1(1)]
						Discuss hazardous materials incident statistics.

UNIT 2 : HAZARDOUS MATERIALS IDENTIFICATION

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:

						Identify the seven clues to the presence of hazardous materials. [NFPA® 472, 4.2.1(7)(a-f), 4.2.2, 4.2.2(1), 5.2.1.1]
						Discuss the occupancy types, locations, and pre-incident surveys that may indicate hazardous materials. [NFPA® 472, 4.2.1(5), 4.2.1(13)]
						Describe the container shapes that may contain hazardous materials. [NFPA® 472, 4.2.1(6), 5.2.1.1.1(1-3), 5.2.1.1.2(1-2), 5.2.1.1.2(3)(a-b), 5.2.1.1.3(1-7), 5.2.1.1.4(1-3), 5.2.1.1.5(1-5), 5.2.1.1.6(1-5)]
						Identify placards, labels, and markings that designate the presence of hazardous materials. [NFPA® 472, 4.2.1(2-3), 4.2.1(7)(a), 4.2.1(9), 4.2.2(2), 5.2.1.2, 5.2.1.2.1(1-3), 5.2.1.3.3, 5.2.2(1)]
						Describe the other markings and colors that may indicate the presence of hazardous materials. [NFPA® 472, 4.2.1(7)(f), 4.2.1(8), 5.2.1.2, 5.2.1.2.2, 5.2.1.3.1(1-3), 5.2.1.3.2(1-6)]
						Explain the written resources available to indicate the presence of hazardous materials. [NFPA® 472, 4.2.1(10)(a-g), 4.2.2(3), 5.2.1.5, 5.2.2(2), 5.2.2(3)(a-j), 5.2.2(5)]
						Discuss the limitations of using the senses to determine the presence or absence of hazardous materials. [NFPA® 472, 4.2.1(11), 4.2.1(12), 5.2.2(3)(d)]
						Discuss monitoring and detection devices. [NFPA® 472, 5.2.4(3), 5.2.4(4)]
						Analyze scenarios to detect the presence of hazardous materials. [Learning Activity 2-1; NFPA® 472, 4.2.1, 5.2.1]
						Interpret representative shipping papers. [Learning Activity 2-2; NFPA® 472, 4.2.1(10)]
						Interpret a safety data sheet (SDS). [Learning Activity 2-3; NFPA® 472, 4.2.1(10)]
						Explain how to identify terrorist attacks and illicit laboratories. [NFPA® 472, 4.2.1(14-20), 5.2.1.6, 5.3.1(4)]

UNIT 3: AWARENESS-LEVEL ACTIONS AT HAZARDOUS MATERIALS INCIDENTS

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies
						Discuss predetermined procedures and emergency response plans. [NFPA® 472, 4.4.1(1)]
						Describe notification requirements. [NFPA® 472, 4.4.2]
						Discuss the use of the Emergency Response Guidebook (ERG). [NFPA® 472, 4.2.3(1-2), 4.4.1(3)(a-b), 4.4.1(4)(a-c), 4.4.1(5)(a-d), 4.4.1(6)(b-c), 4.4.1(7), 4.4.1(8), 4.4.1(9)(a-b), 4.4.1(10), 5.2.2(4)(a-c), 5.2.2(5), 5.2.3(1), 5.2.3(1)(b)(i)]
						Obtain information about a hazardous material using the ERG. [NFPA® 472, 4.2.3, 4.4.2; Skill Sheet 3-1]

						Describe isolation and discuss denial of entry. [NFPA® 472, 4.4.1(6)(a), 4.4.1(11)]
						Discuss terrorist incidents. [NFPA® 472, 4.4.1(12)]

UNIT 4: CHEMICAL PROPERTIES AND HAZARDOUS MATERIALS BEHAVIOR

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies
						Discuss the three states of matter. [NFPA® 472, 5.2.3(1)(a)(vii, ix)]
						Discuss the flammability of various hazardous materials. [NFPA® 472, 5.2.3(1)(a)(iv-vii)]
						Describe vapor density. [NFPA® 472, 5.2.3(1)(a)(xiii)]
						Define solubility and miscibility. [NFPA® 472, 5.2.3(1)(a)(xv)]
						Discuss specific gravity. [NFPA® 472, 5.2.3(1)(a)(xi)]
						Define persistence. [NFPA® 472, 5.2.3(1)(a)(viii)]
						Define reactivity and describe the reactivity triangle. [NFPA® 472, 5.2.3(1)(a)(ii)]
						Describe the General Hazardous Materials Behavior Model. [NFPA® 472, 5.2.1.4, 5.2.3(2-6), 5.2.4(2), 5.2.4(4)]

UNIT 5 : INCIDENT MANAGEMENT

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Describe incident priorities.
						Discuss various incident management systems. [NFPA® 472, 5.2.2(6), 5.4.1(5)(a-b), 5.4.3(3), 5.4.3(4)(a-b), 5.4.3(5), 5.4.3(7)]
						Identify communication procedures and guidelines for use at hazardous materials incidents. [NFPA® 472, 5.5.2(1)]

UNIT 6 : STRATEGIC GOALS AND TACTICAL OBJECTIVES

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Describe each of the steps of the basic problem-solving formula. [NFPA® 472, 5.3.1(1-3), 5.3.2(1), 5.4.3(2), 5.5.1(1)]
						Discuss isolation and scene control. [NFPA® 472, 5.2.1.4, 5.2.4(2), 5.2.4(4), 5.4.1(1-2), 5.4.1(3)(a-b), 5.4.1(6)]

						Explain the notification process. [NFPA® 472, 5.2.2(7), 5.4.3(6), 5.5.2(2)]
						Discuss protection of responders, the public, the environment, and property. [NFPA® 472, 5.3.2(2), 5.4.4(1-3)]
						Describe recovery and termination. [NFPA® 472, 5.5.1(2)]

UNIT 7 : TERRORIST ATTACKS, CRIMINAL ACTIVITIES, AND DISASTERS

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Define terrorism.
						Distinguish between a terrorist attack and a routine emergency.
						Discuss terrorist tactics and types of attacks.
						Discuss explosive attacks.
						Discuss chemical attacks. [NFPA® 472, 5.2.3(9)(a, c-e, g)]
						Discuss biological attacks. [NFPA® 472, 5.2.3(9)(b)]
						Discuss radiological and nuclear attacks. [NFPA® 472, 5.2.3(9)(f), 5.2.4(5)]
						Identify hazards of illegal haz mat dumps.
						Describe proper evidence preservation. [NFPA® 472, 5.4.2]
						Discuss hazardous materials during and after disasters.

UNIT 8 : PERSONAL PROTECTIVE EQUIPMENT

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Discuss respiratory protection. [NFPA® 472, 5.3.3(1)(a)(i-vi), 5.3.3(1)(b), 6.2.3.1(3)(e)]
						Discuss protective clothing and ensembles. [NFPA® 472, 5.3.3(2)(a), 5.3.3(2)(b)(i-iii), 5.4.4(4), 5.4.4(5), 6.2.3.1(1), 6.2.3.1(2)(a-f), 6.2.3.1(3)(a)(i-iii), 6.2.3.1(3)(b-c), 6.2.3.1(3)(d)(i-iv), 6.2.4.1(1-2), 6.2.5.1]
						Don and doff different types of personal protective equipment (PPE). [NFPA® 472, 6.2.4.1(3); Skill Sheet 8-1]
						Discuss inspection, storage, testing, and maintenance of PPE. [NFPA® 472, 5.4.4(6), 5.4.4(7), 6.2.4.1(5)]
						Given hazardous materials scenarios, determine proper PPE for each incident and report and document the decision. [NFPA® 472, 6.2.3.1, 6.2.5.1; Learning Activity 8-1]

UNIT 9 : DECONTAMINATION

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Define decontamination. [NFPA® 472, 5.3.4(1), 5.3.4(2)]
						Identify various decontamination methods. [NFPA® 472, 5.3.4(3), 5.3.4(4)]
						Discuss general guidelines for decon operations.
						Describe the different types of victims that may receive decontamination.
						Describe emergency decontamination. [NFPA® 472, 5.3.4(5), 5.3.4(6)]
						Perform emergency decontamination. [NFPA® 472, 5.4.1(4); Skill Sheet 9-1]
						Describe technical decontamination. [NFPA® 472, 6.2.3.1(3)(f), 6.4.3.2(1-6), 6.4.4.1(1-2)]
						Set up and implement a technical decontamination corridor and undergo decontamination. [NFPA® 472, 6.2.4.1(4), 6.4.3.1, 6.4.4.2(1-2), 6.9.4.1.1(2); Skill Sheet 9-2]
						Perform technical decontamination on a non-ambulatory victim. [NFPA® 472, 6.2.4.1(4); Skill Sheet 9-3]
						Discuss mass decontamination. [NFPA® 472, 6.3.3.2(1), 6.3.3.2(2)(a-c), 6.3.3.2(3-5)]
						Perform mass decontamination. [NFPA® 472, 6.3.4.2; Skill Sheet 9-4]
						Determine the effectiveness of decontamination operations. [NFPA® 472, 6.3.5.1, 6.4.5.1]
						Explain how to implement decontamination. [NFPA® 472, 6.3.6.1(1-4), 6.4.6.1(1-4), 6.9.4.1.1(2)]

UNIT 10 : PRODUCT CONTROL

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Describe each of the various spill control tactics. [NFPA® 472, 6.6.3.1(1), 6.6.3.1(2)(a-j), 6.6.3.2, 6.6.4.1(2)(a-d)]
						Perform absorption/adsorption. [NFPA® 472, 6.6.4.1(3)(a-b); Skill Sheet 10-1]
						Perform damming operations. [NFPA® 472, 6.6.4.1(3)(c); Skill Sheet 10-2]
						Perform diking operations. [NFPA® 472, 6.6.4.1(3)(d); Skill Sheet 10-3]
						Perform diversion operations. [NFPA® 472, 6.6.4.1(3)(f); Skill Sheet 10-

						4]
						Perform retention operations. [NFPA® 472 6.6.4.1(3)(g); Skill Sheet 10-5]
						Perform vapor suppression. [NFPA® 472 6.6.4.1(1), Skill Sheet 10-6]
						Perform vapor dispersion. [NFPA® 472, 6.6.4.1(3)(i); Skill Sheet 10-7]
						Perform dilution operations. [NFPA® 472, 6.6.4.1(3)(e); Skill Sheet 10-8]
						Discuss leak control. [NFPA® 472, 6.6.4.1(4-5), 6.6.4.2]
						Perform remote valve shutoff. [NFPA® 472, 6.6.4.1(3)(h); Skill Sheet 10-9]
						Explain fire control.

UNIT 11 : AIR MONITORING AND SAMPLING

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Discuss air monitoring and sampling.
						Discuss concentrations and exposure limits.
						Explain the basics of air monitoring. [NFPA® 472, 6.7.3.3, 6.7.3.4]
						Describe the selection and maintenance of detection and monitoring devices. [NFPA® 472, 6.7.3.1]
						Explain how to detect specific hazards. [NFPA® 472, 6.7.3.2]
						Perform a pH test on an unknown liquid. [NFPA® 472, 6.7.4.1, 6.7.4.2; Skill Sheet 11-1]
						Perform air monitoring with a multi-gas meter. [NFPA® 472, 6.7.4.1, 6.7.4.2; Skill Sheet 11-2]
						Perform air monitoring with a photoionization detector. [NFPA® 472, 6.7.4.1, 6.7.4.2; Skill Sheet 11-3]
						Perform air monitoring with colorimetric indicator tubes. [NFPA® 472, 6.7.4.1, 6.7.4.2; Skill Sheet 11-4]
						Detect radiation using a gas-filled detector. [NFPA® 472, 6.7.4.1, 6.7.4.2; Skill Sheet 11-5]
						Describe other technologies used to detect hazardous materials.

UNIT 12 : VICTIM RESCUE AND RECOVERY

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Discuss rescue operations. [NFPA® 472, 6.8.3.1(1), 6.8.3.1(2)(a-d), 6.8.3.1(3-4), 6.8.4.1(1), 6.8.4.1(5)]
						Conduct a triage. [NFPA® 472, 6.8.4.1(4); Skill Sheet 12-1]
						Identify rescue tools and equipment. [NFPA® 472, 6.8.3.2, 6.8.4.1(2)]
						Describe various rescue methods.
						Demonstrate the incline drag. [NFPA® 472, 6.8.4.1(3); Skill Sheet 12-2]
						Demonstrate the blanket drag. [NFPA® 472, 6.8.4.1(3); Skill Sheet 12-3]
						Demonstrate the webbing drag. [NFPA® 472, 6.8.4.1(3); Skill Sheet 12-4]
						Demonstrate the cradle-in-arms lift/carry – One-rescuer method. [NFPA® 472, 6.8.4.1(3); Skill Sheet 12-5]
						Demonstrate the seat lift/carry – Two-rescuer method. [NFPA® 472,

						6.8.4.1(3); Skill Sheet 12-6]
						Demonstrate the extremities lift/carry – Two-rescuer method. [NFPA® 472, 6.8.4.1(3); Skill Sheet 12-7]
						Demonstrate the chair lift/carry method 1 – Two rescuers. [NFPA® 472, 6.8.4.1(3); Skill Sheet 12-8]
						Demonstrate the chair lift/carry method 2 – Two rescuers. [NFPA® 472, 6.8.4.1(3); Skill Sheet 12-9]
						Discuss recovery operations. [NFPA® 472, 6.8.3.1(1), 6.8.3.1(2)(e)]

UNIT 13 : EVIDENCE PRESERVATION AND SAMPLING

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Discuss various hazards at crimes involving hazardous materials or weapons of mass destruction (WMD). [NFPA® 472, 6.5.2.1(1), 6.5.2.1(2)]
						Discuss the first responder's role in investigation.
						Describe the different response phases at criminal hazardous materials/WMD incidents.
						Explain the FBI's twelve-step process for collecting evidence. [NFPA® 472, 6.5.3.1(1-9)]
						Demonstrate evidence preservation and sampling. [NFPA® 472, 6.5.4.1(1-14); Skill Sheet 13-1]

UNIT 14 : ILLICIT LABORATORIES

Outcomes: Upon completion of the unit, the student will be able to successfully demonstrate the ability to:

A	B	C	D	F	N	Specific Competencies:
						Discuss general hazards at illicit laboratories. [NFPA® 472, 6.9.2.1(4), 6.9.4.1.1(3)]
						Identify and avoid booby traps at illicit laboratories. [NFPA® 472 6.9.4.1.1(3); Skill Sheet 14-1]
						Discuss drug labs. [NFPA® 472, 6.9.2.1(1), 6.9.4.1.2(1), 6.9.4.1.2(3)]
						Describe chemical agent labs. [NFPA® 472, 6.9.2.1(2)]
						Describe explosives labs. [NFPA® 472, 6.9.4.1.2(2-3)]
						Discuss biological laboratories. [NFPA® 472, 6.9.2.1(3)]
						Discuss operations at illicit labs. [NFPA® 472, 6.9.2.1(5), 6.9.3.1, 6.9.3.2.1, 6.9.3.2.2(1-6), 6.9.3.3(1)(a-c), 6.9.3.4.1, 6.9.3.4.2(1-5), 6.9.3.5, 6.9.4.1, 6.9.4.1.1(1), 6.9.4.1.1(4), 6.9.4.1.3]
						Explain remediation of illicit labs. [NFPA® 472, 6.9.4.1.4, 6.9.4.1.5]

Projects Required:
Varies, refer to syllabus.

Textbook:
Contact Bookstore for current textbook.

Materials/Equipment Required:
None

Attendance Policy:
Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:
The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:
Based on classroom occupancy

Course Time Frame:
The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

402.00 Academic Code of Conduct
263.00 Student Appeal of Course Grades
403.00 Student Code of Conduct

Disability Services Program:
Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability which may impact work in this class and which requires accommodations, contact the Disability Services Coordinator.