University of Illinois Fire Service Institute

Course Syllabus

Course Title: Hazardous Materials Technician (470 Ch-11)

Course Duration: 80 Hours

Program: Hazardous Materials Program

Course Prerequisites:

Hazardous Materials Awareness
Hazardous Materials Operations
Or
Hazardous Materials Awareness and Operations

Course Description:

The goal of this 80-hour course is to prepare responders to operate as a local member of a regional hazardous materials response team within the National Incident Management Systems (NIMS) at a CBRNE (Chemical, Biological, Radiological, Nuclear, or Explosive) event requiring a statewide response. The course provides the essential knowledge, skills, and abilities to operate offensively or defensively at an incident involving the release of hazardous materials. The objectives of the course are to teach participants: to classify, identify, and verify known and unknown material by using field survey instruments and equipment; to select and use the proper chemical protective equipment provided to the hazardous materials Technician; to understand hazard and risk assessment techniques for Hazmat and CBRNE environments; to be able to perform advanced control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available; and to develop action plans within the parameters of the State plan for statewide response to WMD events.

Course Requirements:

Pre-Course Work – Completed prior to arriving:
Hazmat Technician Online Step 1:
Review HM Ops chemical and physical terms
Review Completed Site Safety Plan
View four videos (A kit, B kit, C kit, and Midland Kit)
Course Work – Completed during class: Complete all reading, homework, and practical assignments prior to the Final Exam.
Post-Course Work – None

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Required Textbook:
Noll, Gregory, Michael Hildebrand. *Hazardous Materials: Managing the Incident 5th Edition*, Jones & Bartlett, 2023

The textbook is loaned to the student by IFSI for the duration of the class.

Reading Assignments:
Day 1: p. 271-331
Day 2: p. 35-73
Day 3: p. 80-94, 179-222, 337-361, 537-555

Course Policies:

Attendance Policy: IFSI requires students to attend (100%) or make up all course content that leads to certification. Students are expected to attend on time and to remain in class for the duration of the course. Students MUST COMPLETE all portions of a certification course, both classroom and practical, to be eligible to receive their certification.

If a student misses any portion of class with an accumulated absence of 20% or less of scheduled class time, it will be the student's responsibility to arrange the make-up of the missed course content with the instructor(s) or program manager. The student must make up the specific course content that s/he missed, not just the hours. Make-up is limited to 20% of scheduled class time. Make-up must be documented on the class roster. If a student's absence is greater than 20% refer to "True Emergencies" section of the IFSI Examination Policy.

Safety Policy: Students shall understand and follow all instructions pertaining to operational safety, as stated by instructors, or as written in course materials. Instructors and students shall be mindful of safety at all times. Conduct judged to be unsafe shall be grounds for dismissal from the course.

Academic Integrity Policy: IFSI has the responsibility for maintaining academic integrity so as to protect the quality of the education provided through its courses, and to protect those who depend upon our integrity. It is the responsibility of the student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions. Any violation of the code of conduct is grounds for immediate dismissal from the course.

Grading Policy: Decisions regarding certificates of course completion shall be made solely by the lead instructor of the course. All grading of exams shall be conducted by the Curriculum/Testing Office. All grading of practical exercises

shall be based upon the standards set by the regulatory agency referenced in the course material and IFSI.

> Retesting: If a student fails to pass an exam, retesting takes place on set dates at regional sites across the state. More information is provided in the course completion e-mail and on the IFSI website.

American Disabilities Act: As guaranteed in the Vocational Rehabilitation Act and in the American Disabilities Act, if any student needs special accommodations, they are to notify their instructor and provide documentation as soon as possible so arrangements can be made to provide for the student's needs. If arrangements cannot be made at the class site, the student will test at an alternative time and place where the special accommodation can be made.

Evaluation Strategy: Students will be evaluated with an end of course exam and performance evaluation checklists.

Course Content:

Module: 1
Title: Introduction
Terminal Learning Objective:
At the conclusion of this module, the student will understand the standards that apply when responding to a hazardous materials/WMD incident.

Module: 2
Title: Response Components
Terminal Learning Objective:
At the conclusion of this module, the student will explain the 5-step Isolate to Terminate process and how it affects the hazardous materials response.

Module: 3
Title: Toxicology
Terminal Learning Objective:
At the conclusion of this module, the student will explain how hazardous materials enter the body and what their potential effects are.

Module: 4
Title: Collecting and Interpreting Hazard and Response Information
Terminal Learning Objective:
At the conclusion of this module, the student will utilize a minimum of three resources to collect and interpret information concerning hazardous material.

Module: 5
Title: Personal Protective Equipment
Terminal Learning Objective:
At the conclusion of this module, the student will demonstrate the proper selection, use, and maintenance of all four EPA ensemble classifications.

Module: 6
Title: Chemical and Physical Properties
Terminal Learning Objective:
At the conclusion of this module, the student will apply chemical and physical properties of a material to predict how hazardous materials will respond in different situations.

Module: 7
Title: Recognition and Identification
Terminal Learning Objective:
At the conclusion of this module, the student will recognize different types of transportation, pipeline, fixed facilities, containers, markings and determine the hazards associated with the materials transported or stored within the container.

Module: 8
Title: Decontamination
Terminal Learning Objective:
At the conclusion of this module, the student will demonstrate proper selection, set-up, operation, and tear down of a decontamination line.

Module: 9
Title: Product Control
Terminal Learning Objective:
At the conclusion of this module, the student will demonstrate performing control functions, available to the Technician, in support of the Incident Action Plan.

Module: 10
Title: Rescue
Terminal Learning Objective:
At the conclusion of this module, the student will demonstrate several techniques for removing victims from a hazardous environment in a safe and efficient manner.

Module: 11
Title: Monitoring
Terminal Learning Objective:
At the conclusion of this module, the student will describe when and how to employ the use of specialized monitoring techniques at a hazardous material incident.

Module: 12
Title: Incident Management System
Terminal Learning Objective:
At the conclusion of this module, the student will identify the positions that make up the Incident Management System and how to use IMS, Unified Command, and NIMS at a hazardous materials/WMD incident.

Module: 13
Title: The Big Picture
Terminal Learning Objective:
At the conclusion of this module, the student will analyze the incident and be able to decide on a strategy by looking at the big picture.

Module: 14
Title: Exposure Guidelines
Terminal Learning Objective:
At the conclusion of this module, the student will describe how to use different exposure guidelines to assist in the development of emergency response protection strategies.

Module: 15
Title: Container Behavior
Terminal Learning Objective:
At the conclusion of this module, the student will identify factors that determine how hazardous materials containers will behave during an incident and develop a strategy for a response based on the analysis of the container and its behavior.

Module: 16
Title: Sampling
Terminal Learning Objective:
At the conclusion of this module, the student will demonstrate the procedures for collecting a solid and liquid sample utilizing the protocol.

Module: 17
Title: Terrorist and Other Criminal Activities
Terminal Learning Objective:
At the conclusion of this module, the student will classify terrorist incidents into the five basic categories of Chemical, Biological, Radiological, Nuclear, and Explosive.

Module: 18
Title: Radiological Emergencies
Terminal Learning Objective:
At the conclusion of this module, the student will demonstrate detecting and operating at a radiological emergency.

Reference List:

NFPA 470 Hazardous Materials/Weapons of Mass Destruction (WMD) Standard for Responders, 2022 Edition

Noll, Gregory, and Michael Hildebrand. *Hazardous Materials: Managing the Incident, 5th Edition*, 2023

United States Department of Homeland Security. *National Incident Management System, 2017*. Washington D.C., 2004.

U.S. Department of Labor, *Code of Federal Regulations: Labor 29 CFR 1910.120*. Washington D.C., Officer of the Federal Register, National Archives and Records Administration, 2023.

U.S. Department of Labor, *Code of Federal Regulations: Transportation 49 CFR Parts 100 to 177.* Washington D.C., Office of the Federal Register, National Archives and Records Administration, 2011.

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Course Schedule

DAY ONE

Event	Duration
Orientation/Paperwork/PEC Instructions	1 Hour
Module 2 – Response Components	30 Minutes
Module 3 – Toxicology	1 Hour
Module 4 – Collecting and Interpreting Hazard and Response Information	30 Minutes
Drill 1 - Collect and Interpret Hazard & Response Information	30 Minutes
Lunch	
Module 5 – Personal Protective Equipment	1 Hour
Suit Test Demo – TBD	45 Minutes
Drill 6 – Personal Protective Equipment	45 Minutes
Obstacle Course	30 Minutes
Chlorine Kit Move	30 Minutes
Body Recovery/Drag	30 Minutes
Elevation Change	30 Minutes

DAY TWO

Event	Duration
Module 6 – Chemical and Physical Properties	1 Hour
Module 7 – Recognition and Identification Part I	30 Minutes
Ask Rail/Rail Locator Demos	30 Minutes
Module 7 – Recognition and Identification Part II	1 Hour
Module 8 – Decontamination	1 Hour
Lunch	
Drill 7 – Mass Decontamination Drill 14 – Technical Decontamination	1 Hour
Review Site Safety Plan/Homework Review	1 Hour
Module 9 – Product Control	1 Hour
Drill 9 – Control Container Leaks	
Demos – Chlorine A Kit Chlorine B Kit Chlorine C Kit	1 Hour

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DAY THREE

Event	Duration
Drill 5 – Estimating Outcomes & Product Control Drill 10 – Overpacking Non-bulk Containers	1 Hour
Demos – Cromwell Kits/Leak Monster Midland Kit Drums and Overpacking Lab Pack	1 Hour
Four Stations 1. "A" Kit / Plug n Patch Kits 2. "B" Kit / Break 3. "C" Kit / Midland Kit 4. Drums, Lab Packs / Break	2 Hours
Drill 16 – Control Kits in Level A	1 Hour
Lunch	
1. Leak Monster 2. "B" Kit 3. "C" Kit 4. Drums	1 Hour
Module 10 - Rescue	1 Hour
Drill 12 – Rescue an Incapacitated Entry Team Member Drill 13 – Victim Rescue & Recovery	

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DAY FOUR

Event	Duration
Module 11 – Monitoring Part I	1 Hour
Classroom science activity: Chlorine, Gasoline, Sulfuric Acid, Ammonia	1 Hour
Module 12 – Incident Management System	1 Hour
Drill 8 – Action Plan Development Drill 15 – Evaluating and Reporting Progress	30 Minutes
Module 13 – The Big Picture	1 Hour
Drill 4 – Predicting Behavior & Developing Strategies/Tactics	30 Minutes
LUNCH	
Drill 20 – Rescue 1. Patient Packaging 2. Ladder Slide 3. Long Haul 4. Refrigerator Carry	4 Hours

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DAY FIVE

Event	Duration
Drill 19 – DOT 406/Railcar DOT 406 Walk Through Non-Pressure Railcar Walk Through Grounding/Bonding Vetter Plugs Rail Patches Intermodal/DOT 407 Walk Through If Available	4 Hours
Drill 11 – Liquid Product Transfer	
LUNCH	
Incident 1 – Rail Car Incident w/Man Down	4 Hours

DAY SIX

Event	Duration
Week 1 Questions	
Module 14 – Exposure Guidelines	1 Hour
AEGL Activity	1 Hour
Module 12 – Monitoring Part II	1 Hour 30 Minutes
LUNCH	
Drill 17 – Advanced Monitoring Four Stations: Papers/RAID 5 Strips, 4-gas/PID, Draeger Tubes, AreaRae	3 Hours
Module 15 – Container Behavior	1 Hour
Drill 3 – Assessing Container Conditions	30 Minutes

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DAY SEVEN

Event	Duration
Module 16 – Sampling	1 Hour
Sampling Demo Show steps / Kit building.	1 Hour
Drill 2 – Detection, Monitoring, & Sampling Solid, Liquid, & Residue	2 Hours
LUNCH	
Incident 2 – Chlorine 1-ton Incident	4 Hours

DAY EIGHT

Event	Duration
Module 17 – Terrorist and Other Criminal Activities	1 Hour
Module 18 – Radiological	1 Hour
Drill 18 – Radiological Monitoring Easter Egg Hunt Body Survey Suit Survey	2 Hours
LUNCH	
Incident 3 – Radiological Incident	4 Hours

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DAY NINE

Event	Duration
Final Exam	2 Hours
Incident 4 – Comprehensive Final Incident	2 Hours
LUNCH	
Incident 4 – Comprehensive Final Incident (Cont.)	4 Hours

DAY TEN

Event	Duration
OSFM Exam	2 Hours
Performance Evaluations	6 Hours