NASA Safety Training Center Course Catalogue

Fiscal Year 2015

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Memorandum to NASA Safety Training Center Students

The NASA Safety Training Center (NSTC) was established in May 1991 by NASA Headquarters Office of Safety and Mission Assurance to provide up-to-date, high quality, NASA-specific safety training on location to NASA Centers, or simultaneously to multiple Centers over the Video Teleconferencing System (ViTS). Since that time, this team has been actively developing and presenting courses to meet NASA needs.

We are eager to continue to meet your safety training needs in the most cost effective manner possible. As our customer, your expectations are important in defining our future training capabilities. Please let us know if there are training needs that we are not adequately meeting or any modification we can make to better serve your needs. Likewise, reinforce us when we are properly meeting your requirements.

Our desire at the NSTC is to forge and maintain a strong, lasting working relationship whereby we can help fulfill your safety training needs to assist you in the pursuit of the ultimate goal of safe operations.

The NASA Safety Training Center (NSTC) Staff

The NSTC has assembled a staff of technical training personnel dedicated to providing quality safety training to our customers. Our goals include providing NASA Center-specific safety training, optimizing resources (training and travel funds, student time expended, etc.), monitoring and collecting NASA-wide safety training needs, and monitoring advances in state-of-the-art safety training policies, procedures, and equipment. The administrative staff provides support to the instructor staff and to you, our customers. We encourage you to call whenever questions arise concerning safety training.

Our philosophy is to provide a small, full-time administrative and instructional staff and to primarily use working engineers and other safety professionals on a collateral or consultant basis to develop and present courses. This ensures that, whenever possible, courses are instructed by experts whose jobs include (or which have included) day-to-day activities involving the subjects they instruct. The administrative staff handles course scheduling and advertisement and provides support in the course preparation and acquisition of course materials.

Our instructor staff is highly qualified and enthusiastic about developing and presenting the type and quality of safety training needed to provide the knowledge required to perform your increasingly more complex and varied duties and responsibilities safely. The NSTC staff consists of:

Larry Gregg, CSP, Project Lead/Lead Instructor/Developer, is responsible for the supervision and direction of the NSTC staff and its overall operation. He has been with the NSTC since its inception in 1991. He is the key interface between NSTC project support staff and NSTC collateral, consultant, and staff instructors. He develops and manages the course catalogue; annual course needs survey, and annual course schedule. He manages overall course delivery funded by the NASA Headquarters Training and Development Division and development activities for RTOP funded courses. He serves as a course manager for many courses and provides counseling on development and instructional techniques to all instructors. Mr. Gregg has developed and instructed numerous courses for the NSTC and assisted in development, revision, and presentation of many others. His primary areas of expertise include System Safety, Payload Safety, and Mishap Investigation. He holds a B.S. degree in Chemical Engineering from Oklahoma State University, and an M.B.A. in Management from Golden Gate University. Mr. Gregg has been with the NSTC since its inception in 1991 following a 20-year career as an Air Force officer with tours of duty including missile launch operations and systems development and acquisition for Air Force advanced missile and space systems. He has also worked as a Test Safety Officer at JSC since 1992, and this has become his primary duty since HQ funding for the has been reduced in recent years. He has been awarded the Silver Snoopy for his NASA training activities and was selected by the System Safety Society as Educator of the Year for 1997.

Tim Evans, CSHO, is a collateral duty instructor/developer for the NSTC. He has over 35 years of experience in industry on a variety of safety and quality assignments, most including full- or part-time training responsibilities. He has supported the NSTC since 1999 as a full-time instructor/developer, and currently works in the JSC facility engineering group. His course expertise includes Scaffolding Safety, Fall Protection, Machine Guarding, Forklift Safety, Overhead Crane Safety, Lockout/Tagout, Confined Space, Occupational Safety, Construction Safety and Health, and General Industry Safety and Health.

Tom Torpey is an associate staff instructor/developer for the NSTC. Tom has a B.S. Degree in Industrial Administration and an M.S. Degree in Aeronautical Science. He spent 22 years in the US Air Force as a crewmember, aircraft commander, and instructor pilot and has 3000 hours of flying time. He has extensive teaching experience in aviation related areas, mishap investigation, and human factors. In his career as an instructor, he has delivered training to over 5,000 individuals in a wide variety of disciplines. He is also an adjunct instructor with Embry Riddle

Aeronautical University. He has been a part-time instructor for the NSTC since 1995, and joined the staff as a full-time instructor/developer in 2001. He went to associate status in 2013. His course expertise currently includes Investigating Aircraft and Flight Systems Mishaps, Situational Awareness, Crew Resource Management, Aircrew Resource Management, and Maintenance Crew Resource Management. He has been awarded the Silver Snoopy for his NASA training activities.

Shirley Robinson (NSTC Administrative Staff) provides support in the areas of course typing and logistics, student enrollment, maintenance of student training records, as well as handling follow-up course coordination, rosters, and course completion. She coordinates marketing and SATERN scheduling activities for courses/instructors, and follows up on all the details regarding courses. We rely on her to provide an environment conducive to facilitating safety learning and programs and for quality customer communication.

Contact Information

NASA Safety Training Center

Center Safety and Fire Operations (CSFO) Contract at JSC

Prime and NSTC Contractor: NLT Management Services, Inc.

NASA/Johnson Space Center

Mailcode: NS20

Houston, Texas 77058

Commercial Telephone: (281) 244 -1278 or -1284

E-Mail: larry.gregg-1@nasa.gov

Larry Gregg, NSTC Project Lead & Lead Instructor/Developer

Tim Evans, Instructor/Developer

Tom Torpey, Associate Instructor/Developer

Shirley Robinson, Administrative Staff

Generally all questions concerning the NSTC should be directed to the Center point-of-contact, or the NSTC NLT Management Services contractor staff. They collect/analyze the annual training needs survey, manage course schedules, develop and instruct courses, and compile/maintain records on customer needs, course critiques, and student attendance. For government-to-government contact concerning the NSTC, its courses, or operations, Center safety offices may contact the following:

Elmer Johnson, NASA/JSC, Safety Training Coordinator, NASA/JSC/NS211, Telephone: (281) 483-2084

Dan Clem NASA/JSC/NS211, CISS Alternate COTR, Telephone: (281) 483-4272

Gerald D. Schumann, OSMA-MI, Mishap Investigation Program Manager, NASA Headquarters NSTC Point of Contact, John F. Kennedy Space Center, Florida 32899, Telephone: 321-861-2312

Courses and Training

The course descriptions in this catalogue are organized into five functional area categories and include such pertinent data as suggested target audience, course reference number, course topics, preferred delivery method, and available CEUs/CM's. The six categories are Fire Safety, Occupational/Industrial Health and Safety, Safety Engineering, Special Programs, and Mishap Investigation.

Fire Safety

SMA-SAFE-NSTC-0207, Fire Protection - Theory and Practice

(3 Days)

This is a basic course that introduces the student to the recognition of potential fire hazards and procedures to minimize losses due to fires. Topics include previous and current trends in fire losses, the chemistry and mechanics of fire, fire prevention, fire detection, and fire suppression. 29 CFR Subparts E and L, the NASA Safety Standard for Fire Protection (NASA-STD-8719.11, Rev. A), and current NFPA codes and standards provide the basis for the course.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Those who need a basic understanding of fire protection equipment, practices, and related fire codes

CEUs: 1.8

SMA-SAFE-NSTC-0217, Fire Protection - Life Safety Code

(3 Days)

This course addresses the Life Safety Code (NFPA 101). It is an overview of the NFPA's code to protect people from fire in buildings and structures. Discussions will primarily focus on chapters 1 through 11, which address fundamental requirements, classification of occupancy and hazard of contents, means of egress, protection equipment, specific occupancies, and operation features. In addition, several occupancy chapters commonly applicable at NASA facilities are also discussed. A calculator is needed during this class

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Fire Protection Professionals who are responsible for reviewing and designing drawings and inspecting facilities for fire safety.

CEUs: 1.8

SMA-SAFE-NSTC-0051, Explosive Safety Management and Engineering

(3 Days)

This course covers the requirements for NASA explosive safety programs and their management as defined in NASA-STD-8719.12, "Safety Standard for Explosives, Propellants, and Pyrotechnics". It also covers basic explosive safety engineering principles, concepts, and requirements in TM5-1300/NAVFAC P-397/AFM 88-22, "Structures to Resist the Effects of Accidental Explosions", and DOD 6055.9-STD, "Ammunition and Explosives Safety". The course includes hands on demonstrations of software currently available to calculate explosive overpressures, fragment velocities, quantity distance calculations, etc., and exercises to try out tools and techniques discussed. A calculator and a laptop computer will be required for this class. Course topics include: What are the effects of an explosion? What are the effects of fragments? How can personnel/facilities be protected from explosive effects? How do I site my facilities to reduce the effects from an explosion? How do I build my facilities to reduce the effects from an explosion? What types of tools are available to perform the job?

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Engineers with responsibility for designing new or modifying existing explosives, propellant, or pyrotechnics storage, manufacturing, and test facilities
- Managers of explosives, propellant, or pyrotechnics storage areas, supervisory personnel managing the storage and handling of explosive devices.
- Anyone working with explosives, propellant, or pyrotechnics

CEUs: 1.8

SMA-SAFE-NSTC-0082, Basic Explosives Safety

(2 Days)

The Basic Explosives Safety Course provides initial or refresher training for technicians, supervisors, and managers that work with or in the presence of explosive systems, components, or materials. In-class mishap case studies are used in addition to lecture and video to ensure student understanding.

Topics include:

- Characteristics & Hazards of Explosives,
- Explosive Effects,
- Types of Explosive Systems/Components/Devices used in NASA,
- Operating Procedures
- Explosive Siting Criteria
- Storage, Handling, and Disposal of Explosive Wastes
- Fire Protection
- Electricity, Electromagnetic Radiation, ESD, and Lightning Protection
- Housekeeping
- Personal Protective Equipment
- Tooling and Equipment Safety
- Hazard Classification Systems and Divisions,
- Quantity/Distance Requirements
- Transporting, Shipping, and Handling Explosives, Propellants, and Pyrotechnics
- Explosive Hazards and Exposure Risk Assessment.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Technicians, supervisors, and managers that work with or in the presence of explosive systems, components, or materials.

CEUs: 1.2

SMA-SAFE-NSTC-0009, Refresher Course for Explosives Handlers and Operational Personnel

(8 Hours)

This course covers safe practices for handling, storing, shipping, and testing explosive systems, components and devices. It is specifically designed for technicians, supervisors, test engineers, and managers that are involved with routine procedures at NASA test sites and operations facilities. The core subjects, which address basic explosives safety, are supplemented by NASA Center-specific training material. This course can be tailored to meet local requirements and is ideal for annual refresher training.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Technicians, Engineers, and Managers subject to safety requirements at explosives work sites.

CEUs: 0.6

SMA-SAFE-NSTC-0028, Crane Operations and Rigging Safety Refresher

(4 Hours)

This course serves as a refresher in overhead crane safety and awareness for operators, riggers, signalmen, supervisors, and safety personnel and to update their understanding of existing Federal and NASA standards and regulations related to such cranes. Areas of concentration include: general safety in crane operations, testing, inspections, pre-lift plans, and safe rigging. This course will primarily be presented via the NASA Videoteleconferencing system and the instructor-led version of this class will only be available if combined with delivery of another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. This course is intended to provide the classroom training for re-certification of already qualified crane operators, or for those who have only a limited need for overhead crane safety knowledge. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Crane Operators
- Riggers
- Signalmen.
- Site Supervisors.
- Safety Personnel & others involved with cranes and/or material handling at NASA facilities.

No CEUs are available for this course.

SMA-SAFE-NSTC-0030, Aerial Platform

(3 Hours)

This course provides classroom training as required by OSHA 29 CFR 1910.67(C)(2)(ii). This course provides the classroom training to allow employees to have on-site hands-on field training and testing to obtain site approval for use of aerial lifts on a NASA site. Discussions include the awareness of hazards and how to gain from lessons learned. This course will primarily be presented via the NASA Videoteleconferencing system and the instructor-led version of this class will only be available if combined with another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Supervisors over aerial lift operations.
- Aerial lift operators.

No CEUs are available for this course.

SMA-SAFE-NSTC-0036, Battery Safety

(2 Days)

This course will provide the student with an understanding of battery operations and hazards in NASA's space applications. Basic principles of batteries will be discussed in addition to safety requirements and controls for their hazards. The course will include discussion of NASA and other launch facility safety requirements for battery design and usage. Specific NASA applications of battery technology in ISS, International Partner and Commercial Crew space vehicle, payload and GFE applications along with their safety requirements and issues will be discussed including use of Commercial-Off-The-Shelf (COTS) batteries.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Supervisors managing the usage and handling of batteries, science and engineering personnel designing, planning and operating battery powered systems (including payloads) for space use
- Technical personnel performing maintenance and operations for battery systems.

CEUs: 1.2

SMA-SAFE-NSTC-0039, Establishing, Maintaining, and Assessing OSHA Voluntary Protection Program (VPP) Compliant Safety and Health Programs

(2 Days)

This course will provide knowledge and understanding the OSHA Voluntary Protection Program, including in-depth discussions of the 32 program elements and how to implement them. The course includes a discussion of the NASA requirements for Operational Readiness Inspections (ORI), User Readiness Reviews (URR) and Test Readiness Reviews (TRR) to ensure safety of NASA facilities, operations, and tests. It will additionally address the elements of the NASA Headquarters Agency Safety Initiative (ASI), which directs all Centers to become VPP certified.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- NASA mid- and upper-level managers, supervisors, and others tasked with ensuring the existence of a safe work environment through policy, planning, and control of activities
- All who are interested in becoming familiar with VPP

CEUs: 1.2

SMA-SAFE-NSTC-0047, OSHA Record Keeping Seminar

(3 Hours)

This seminar will assist the student in understanding the new OSHA rules and requirements for record keeping. The 29 CFR 1904 Recording and Reporting Occupational Injuries and Illnesses has been completely revised and the new rules took effect on January 1, 2002. Everything concerning this new standard from the scope of "who must comply", to the new more specifically defined "work-related recording criteria" is outlined in this seminar. Several examples of the "old rule" compared to the "new rule" are presented to aid those making the transition. Workshop activities accomplished during class include discussion of some "sanitized" case histories for determination of "recordables." This seminar is recommended for those who are responsible for reporting occupational injuries and illnesses at their work sites. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Supervisors and Managers.
- Anyone who may be responsible for reporting/recording occupational injuries and illnesses in the workplace.

No CEUs are available for this course

SMA-SAFE-NSTC-0048, Excavation and Trenching Safety Competent Person Class

(8 Hours)

The purpose of this course is to provide the student with an in-depth understanding of NASA and OSHA excavation safety requirements. Students will be trained in the standards, procedures, and practices necessary to meet the competent person requirements of the CFR 1926.650 Subpart P – Excavations and Trenching Construction. This course covers the fundamentals of safety requirements for excavation and trenching; and includes the safety requirements for shoring and soil testing. Also included in the course are topics such as barricading, signage, and fall protection. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Excavation Competent Persons, and Supervisors.
- Anyone working around or with excavation and/or trenching.

CEUs: 0.6

SMA-SAFE-NSTC-060A, Steel Erection

(8 Hours)

The primary purpose of the course is to provide employees with the standards, procedures, and requirements necessary for safe operations involving erection of steel structures. The course will emphasize safety requirements for steel erectors, supervisors, and safety personnel and will further their understanding of standards and regulations related to OSHA 1926.750 Subpart R, ANSI standards, and NASA requirements. Students are provided with basic information concerning scope and application, definitions, site layout, erection plan, hoisting and rigging, and structural steel assembly. Those individuals desiring to become "competent persons" in steel erecting should take this course and the NSTC Construction Safety and Health course, SMA-SAFE-NSTC-0200. This course will primarily be presented in the classroom. Please contact the NSTC management staff directly for determination of need/availability of the instructor-led version of this class for presentation at your location. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Those who work with steel erection operations.
- Construction Safety personnel.
- Managers who oversee steel erection operations.

0. 6 CEUs available

SMA-SAFE-NSTC-0200, Construction Safety and Health

(4 Days)

This course assists the student in effectively conducting construction inspections and oversight. Participants are provided with basic information about construction standards, construction hazards and control, health hazards, trenching and excavation operations, cranes, electrical hazards in construction, steel erection, ladders, scaffolds, concrete, and heavy construction equipment. This course is based on the OSHA Training Institute Construction Safety course and is approved for award of the OSHA course completion card. Course may include a field exercise at a construction site if feasible. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Professional Safety and Health personnel.
- Construction Managers, Construction Site Inspectors, and those whose day-to-day duties include construction work.

CEUs: 2.4

SMA-SAFE-NSTC-0201, Construction Safety and Health Overview

(1-1/2 Days)

This course is intended to provide an overview of construction industry safety and health standards to entry-level workers, Managers, Supervisors and safety professionals. It is based on the OSHA 10-hour construction safety and health course. The five one-hour mandatory topics areas are listed below, and each center should choose five other one-hour topic areas from the options provided below. Attendance to the 10-hour class will result in the student receiving a card of completion from OSHA. Those whose day-to-day work involves construction should take SMA-SAFE-NSTC-0200, Construction Safety and Health. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

REQUIRED COURSE TOPICS:

- Introduction to OSHA 2 hours

Focus Four Hazards

- Subpart K: Electrical
- Subpart M: Fall Protection
- Struck By
- Caught in/between
- Subpart E: Personal Protective and Lifesaving Equipment
- Subpart X: Stairways and Ladders

OPTIONAL COURSE TOPICS: Choose five:

(One Hour each)

- Subpart F: Fire Protection and Prevention
- Subpart H: Materials Handling, Storage, Use and Disposal
- Subpart I: Tools - Hand and Power
- Subpart L: Scaffolds
- Subpart N: Cranes, Derricks, Hoists, Elevators, and Conveyors
- Subparts O, W and G: Motor Vehicles, Mechanized Equipment

- Subpart P: Excavations
- Subpart Q: Concrete and Masonry Construction
- Confined Space Entry

Target Audience:

- Entry level construction workers
- Managers, supervisors, and safety and health professionals who need only a basic knowledge of safety and health issues associated with construction

CEUs: 0.9

These 2 – 3 hour seminars provide more detailed information concerning specific aspects of construction industry safety and health standards. These seminars are intended to provide more information than the overview or introductory level information presented in SMA-SAFE-NSTC-0201, Construction Safety and Health Overview but who don't need to be designated as "competent Persons." Individuals desiring to become "competent persons" should take the OSHA 200 Construction 30 hour class or should take the appropriate comprehensive level NSTC course (for example, SMA-SAFE-NSTC-0208, Mobile Crane Safety, etc. These seminars allow individuals to tailor or focus their training on specific aspects of construction. These courses will primarily be presented via the NASA Videoteleconferencing system and the instructor-led version of this class will only be available if combined with another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. There will be a final exam associated with this courses which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Safety personnel.
- Those working on construction sites
- Supervisors and managers who oversee construction operations.

No CEUs available

Specific Seminars are as follows:

SMA-SAFE-NSTC-0045, Excavation and Trenching Safety Seminar

(3 Hours)

The purpose of this course is to provide employees with the standards, procedures, and practices necessary to meet the standards in CFR 1926.650 Subpart P – Excavations and Trenching Construction. Excavation, trenching, and soil testing are the fundamental concepts covered in this course. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0057, Hand and Power Tools

(2 Hours)

This course is based on OSHA CFR 1910.28 and 1926.451, requirements for working with hand tools safely in the general and construction industries. During the course, the student will receive an overview of those topics needed to work safely with hand and power tools including: standards, terminology, inspection of hand and power tool components, and proper usage. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0059, Safety of Mobile Cranes, Derricks, Hoists, Elevators and Conveyors in Construction

(3 Hours)

The primary purpose of the course is to provide employees with the standards, procedures, and requirements necessary to meet CFR 1926.550 Subpart N, Mobile Crane and Derricks. The course goal is to increase safety awareness for operators, riggers, signalmen, supervisors, and safety personnel involved in construction operations; and to further their understanding of safety standards and regulations related to lifting devices. This course introduces the student to the pertinent requirements in OSHA 1926.550, ANSI standards, and NASA requirements. Students are provided with basic information concerning crane safety, crane operations, crane inspections and maintenance, pre-lift plans, wire rope, rigging components, and rigging safety. The course is intended to provide the basic for those operating in and around mobile cranes. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0060, Steel Erection

(3 Hours)

The primary purpose of the course is to provide employees with the standards, procedures, and requirements necessary for safe operations involving erection of steel structures. The course will emphasize safety awareness for steel erectors, supervisors, and safety personnel and will further their understanding of standards and regulations related to such work including OSHA 1926.750 Subpart R, ANSI standards, and NASA requirements. Students are provided with basic information concerning scope and application, definitions, site layout, erection plan, hoisting and rigging, and structural steel assembly. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0061, Signs, Signals, and Barricades

(2 Hours)

This course is based on OSHA CFR 1926.200, requirements for working with signs, signals, and barricades in the construction industry. In this course, the student will receive an overview of those topics needed to work safely in circumstances where signs, signals, and/or barricades are required. Topics covered include: 1926.200 OSHA standards, terminology, and proper usage. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0062, Occupational Health and Environmental Controls

(3 Hours)

This course is based on OSHA CFR 1926.50, requirements for medical services and first aid, sanitation (1926.51), occupational noise (1926.52), ionizing radiation (1926.53), non-ionizing radiation (1926.54), hazard communication (1926.59), lead (1926.62), and process safety management of highly hazardous chemicals (1926.64). During the course, the student will receive an overview of those topics as needed to work safely in construction operations. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0063 Material Handling, Storage, Use and Disposal

(3 Hours)

This course is based on OSHA CFR 1926.250 - General Requirements for Storage, OSHA CFR 1926.251 - Rigging Equipment for Material Handling, and OSHA CFR 1926.252 - Disposal of Waste Materials for the Construction Industry. During the course, the student will receive an overview of these topics, which are needed in handling materials to meet the requirements of the OSHA 200 Construction Safety and Health Standards. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0064, Welding and Cutting Safety

(3 Hours)

This course is based on OSHA CFR 1926.350 - Requirements for Working with Gas Welding and Cutting, 1926.351 - Arc Welding and Cutting, 1926.352 - Fire prevention, Ventilation and Protection in Welding Cutting and Heating, 1926.354 - Welding Cutting and Heating in way of Preservation Coating in the Construction Industry. During the course, the student will receive an overview of those topics needed to work safely in welding and cutting operations. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0065, Stairways and Ladders

(3 Hours)

This course is based on OSHA CFR 1926.1050 through 1926.1059 Subpart X - Stairways and Ladders. During the class, the student will become familiar with the general requirements for working on stairways and ladders (OSHA CFR 1926.1051), OSHA CFR 1926.1052 (stairways), OSHA CFR 1926.1053 (Ladders), and OSHA CFR 1926.1060 (training requirements in the construction industry). The student will be shown the working guidelines, training requirements and inspection requirements for ladders. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0066, Construction (CFR 1926) Safety and Health Provisions

(3 Hours)

This course is based on OSHA CFR 1926, Subpart C- 1926.20 - Requirements for General Safety and Health Provisions, OSHA CFR 1926.21 - Safety Training andEducation, and OSHA CFR - 1926.25 Housekeeping. During the course, the student will receive an overview of those topics needed to work safely on a construction site. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-066A, General Industry (CFR 1910) Safety and Health Provisions

(3 Hours)

This course is based on the OSHA CFR 1910 course, Requirements for General Safety and Health Provisions. It will provide a general overview of OSHA 1910 safety requirements . During the course, the student will receive an overview of those topics needed to work safely in general industry. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0067, Personal Protective and Life Saving Equipment

(3 Hours)

This course is based on OSHA CFR 1926.95 through 1926.107 of the construction industry regulations, Subpart E, Personal Protective and Life Saving Equipment. During the course, the student will become familiar with the 1926.95 through 1926.107 regulations criteria for personal protective requirements in construction, and will receive an overview of those topics needed to apply the proper personal protection equipment. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0068, Demolition

(3 Hours)

This course is based on OSHA CFR 1926.850 through 1926.859 Subpart T Demolition. The student will cover Preparatory Operations (1926.850), Chutes (1926.852), Material Removal (1926.853), Removal of Walls, Masonry Sections and Chimneys (1926.854), Manual Removal of Floors (1926.855), Storage (1926.857), and Mechanical Demolition (1926.859). During the course, the student will receive an overview of those topics needed to work safely in accomplishing demolition activities and will be shown the working guidelines, training requirements, and inspection to be accomplished before demolition is started. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0069, Concrete and Masonry

(3 Hours)

This course is based on OSHA CFR 1926.700 through 1926.705 Subpart Q Concrete and Masonry Construction. The student will cover the Scope, application, and definitions applicable to this subpart, General requirements (1926.701), Equipment and tools (1926.702), Requirements for cast-in-place concrete (1926.703), General requirements for form work (1926.703), pre-cast concrete (1926.704), Lift-slab operations (1926.705), Masonry construction (1926.706). There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0070, Fire Protection and Prevention in Construction

(3 hours)

This basic course introduces the student to the recognition of potential fire hazards and procedures required to meet the OSHA 1926.150 Fire protection, 1926.151 Fire Prevention, 1926.152 Flammable and combustible liquids, 1926.153 Liquefied petroleum gas, 1926.154 temporary heating devices, 1926.155 Definitions to this Subpart F to minimize losses due to fires. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0071, Underground Construction, Caissons, and Cofferdams

(3 Hours)

This course is based on OSHA CFR 1926.800 through 1926.804 Subpart S, requirements for working underground construction, caissons, cofferdams, and compressed air in the construction industry. In this course, the student will receive an overview of the knowledge needed to work safely in circumstances which involve working with construction of underground tunnels, shafts, chambers, and passageways. Topics covered include: access and egress, safety instructions, tools and protective equipment, and compressed air. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0072, Motor Vehicles, Mechanized Equipment, and Rollover Protective Structures and Overhead Protection

(3 Hours)

This course is based on OSHA CFR 1926.600 through 1926.606 Subpart O (requirements for working with Equipment, Motor vehicles, Material handling equipment, Pile driving equipment, Site clearing, Marine operations and equipment used in the construction industry) and 1926.1000 through 1926.1003 Subpart W (rollover protection overhead structures; protection). In this course, the student will receive an overview of those topics needed to work safely. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0073, Toxic and Hazardous Substances (Asbestos and Cadmium)

(2 Hours)

This course is based on OSHA CFR 1926, Subpart C- 1926.1101 - Requirements for OSHA. General Safety and Health Provisions, Safety Training and Education. During the course, the student will receive an overview of those topics needed to work safely, exposure assessments and monitoring, understanding permissible exposure limits (PEL), respiratory protection, protective clothing, and respiratory protection. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0075, Power Transmission and Distribution

(2 Hours)

This course is based on OSHA CFR 1926.950 - 960 Subpart v, requirements for working with Power Transmission and Distribution in the construction industry. In this course, the student will receive an overview of those topics needed to work safely in circumstances where the construction of electric transmission and distribution lines and equipment are required. Topics covered include: 1926.950 OSHA standards, General requirements, 1926.951 Tools and Protective equipment, 1926.952 Mechanical equipment, 1926.953 Material Handling, 1926.954 Grounding for protection of employees, 1926.955 Overhead lines, 1926.956 Underground lines, 1926.957 Construction in energized substations, 1926.959 Lineman's body belts, safety straps and lanyards, 1926.960 Definitions applicable to this subpart. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

SMA-SAFE-NSTC-0204, Machinery and Machine Guarding

(3 Days)

This course provides the student with an in-depth understanding of NASA and OSHA requirements for machinery and machine guarding. It is based on the OSHA Training Institute Machinery and Machine Guarding course, and provides the foundation for meeting our goal of contributing to improving the overall safety of NASA operations. The course also includes an overview of various types of common machinery used at NASA, and the safety standards relating to those types of machines. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Maintenance Repair Supervisors, fabrication shop personnel, and anyone working around or with machinery.

CEUs: 1.8

SMA-SAFE-NSTC-0046, Machine Guarding Seminar

(4 Hours)

This course is designed to provide an overview or refresher of hazards, needs, and requirements for those who may use machines and machinery during the performance of their duties. Basic requirements from NASA and OSHA machine guarding standards will be discussed along with an overview of protective devices and procedures. This course is based on the OSHA Training Institute Machinery and Machine Guarding course. The course includes quick review various types of common machinery used at NASA and the safety standards relating to those types of machines. The course is intended as a refresher for those who have taken SMA-SAFE-NSTC-0204, Machinery and Machine Guarding, and have the need to use machinery in the performance of their duties, and/or for those with safety oversight/inspection responsibilities for operations where machinery is used. The instructor-led version of this class will only be available if combined with one or more other course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. It is also available for delivery via the NASA Videoteleconferencing System (ViTS). Check with the NSTC management staff for determination. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Individuals working with or around machinery, or supervising those who do

No CEUs available

SMA-SAFE-NSTC-0205, Overhead Cranes and Material Handling

(2 Days)

The primary purpose of the course is to promote overhead crane safety and awareness for operators, riggers, signalmen, supervisors, and safety personnel; and to further their understanding of the Federal and NASA standards and regulations related to such cranes. This course introduces the student to various types of overhead and gantry cranes and hoists used in general industry and construction operations; and includes a review of the pertinent OSHA and ANSI standards and NASA requirements. Students are provided with basic information concerning crane safety, crane operations, crane inspections and maintenance, pre-lift plans, wire rope, rigging components and rigging safety. The course is intended to provide the basic knowledge (both in breadth and in depth) for those operating in and around overhead cranes. It will provide classroom training which, when combined with the center's own hands-on training, will serve to certify overhead crane operators as required. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Crane Operators, Signalmen, and Riggers.
- Crane Site Supervisors. And Safety Personnel.
- Others involved with cranes and/or material handling at NASA facilities.

CEUs: 1.2

SMA-SAFE-NSTC-0208, Mobile Crane Safety

(2 Days)

The primary purpose of the course is to promote mobile crane safety awareness for operators, riggers, signalmen, supervisors, and safety personnel and to further their understanding of Federal and NASA standards and regulations related to such cranes. This course introduces the student to various types of mobile cranes, and provides a review of the pertinent OSHA and ANSI standards and NASA requirements. Students are provided with basic information concerning crane safety, crane operations, crane inspections and maintenance, pre-lift plans, wire rope, rigging components, and rigging safety. The course is intended to provide the basic knowledge (both in breadth and in depth) for those operating in and around mobile cranes. It will provide classroom training which, when combined with the center's own hands-on training, will serve to certify overhead crane operators as required

Target Audience:

- People who work with operators and riggers.
- Construction Safety personnel.
- Managers who oversee operations using mobile cranes.

CEUs: 1.2

SMA-SAFE-NSTC-0210, Forklift Safety

(3 Hours)

The basis for the course is OSHA 29 CFR 1910.178(L). Discussions include the awareness of hazards and how to gain from lessons learned. Other topics include the mechanics of a fork truck, inspections and maintenance, safe driving, pedestrian and traffic rules, special operating rules, stacking and tiering, and emergency procedures and refueling. This course provides training to support either an initial certification or a recertification. Video teleconferencing system and the instructor-led version of this class will only be available if combined with delivery of another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. This course will primarily be presented via the NASA Video teleconferencing System. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Supervisors over forklift operations.
- Forklift operators.
- Safety personnel.

No CEUs available.

SMA-SAFE-NSTC-0224, Laboratory Safety and Health

(2 Days)

This course addresses topics useful in preventing disease and injury among laboratory workers and prepares laboratory workers and supervisors, industrial hygienists, and safety professionals to recognize, evaluate, and control the hazards that are specific to this type of workplace. The course includes discussion of the OSHA Laboratory Standard, 29 CFR 1910.1450, and implementation of Chemical Hygiene Plans as well as discussion of chemical and physical hazards in laboratories.

Target Audience:

- Laboratory, Safety, Reliability, Quality, and Maintainability, and Health Professionals and Managers.
- Industrial Hygienists.
- Lab workers or anyone working in or around a laboratory.

CEUs: 1.2

SMA-SAFE-NSTC-0225, Occupational Ergonomics (currently inactive)

(2 Days)

This course introduces the student to the application of ergonomic principles in the design of office and industrial workstations, tools, and procedures. It discusses worker/machine trade-off and human factor considerations for the reduction of stress and strain to the employee's body in order to improve safety and employee performance. The topics include: cumulative trauma disorders, back injuries, biomechanics, anthropometry, industrial risk factors, tool design, materials handling, video display terminals, workstation design, and ergonomics regulations and guidelines. Course highlights include industrial and office case studies as well as workshops in workstation and task evaluation.

Target Audience: Safety, Reliability, Quality, Maintainability, Health Professionals and Managers.

CEUs: 1.2

SMA-SAFE-NSTC-0309, Electrical Safety Standards

(3 ½ Days)

This course utilizes the OSHA standards and the National Electrical Code to provide an overview of electrical installations and equipment with emphasis on controlling electrical hazards. Participants gain knowledge of single and three phase systems, energized parts, cord and plug connected equipment, fixed equipment, grounding, ground fault circuit interrupters, personal protective equipment, hazardous energy control, first aid or medical services, and safe work practices. Special emphasis is placed on electrical hazard recognition and OSHA inspection procedures. Please note that a 3-hour Electrical Safety Refresher is available for those who have previously taken this course (see description for SMA-SAFE-NSTC-0310). This course does not cover spacecraft or flight electrical systems.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Electrical Design Engineers, and anyone working around or with electrical systems.

CEUs: 2.1

SMA-SAFE-NSTC-0310, Electrical Safety Refresher

(3 Hours)

This course is designed to provide the student with a review of OSHA electrical standards, and the hazards associated with electrical installations and equipment. Topics may include single- and three-phase systems, cord- and plug-connected and fixed equipment, grounding, ground fault circuit interrupters, hazardous locations, and safety-related work practices. Emphasis is placed on discussion of those areas most pertinent to the class makeup and needs. This course is designed for those who have either taken the 3-day SMA-SAFE-NSTC-0309, Electrical Safety Standards, or who have a lot of experience working with electrical systems. It may also be used for those who have a need for only electrical safety awareness, and who do not work with electrical systems on a regular basis. This course does not cover spacecraft or flight electrical systems. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Electrical Design Engineers, and anyone working around or with electrical systems.

No CEUs are available for this course.

SMA-SAFE-NSTC-0311-AU, Fall Protection Authorized User

(1 day)

This course provides all of the information necessary to properly use, inspect, and maintain fall protection equipment at the jobsite and will satisfy the ANSI requirements for documented training adequate to qualify as an authorized user of such equipment. During this course, we will discuss all stages of the fall protection hierarchy. We will address the four parts of a fall arrest system, fall protection equipment inspection, and proper care and maintenance of fall protection equipment among other topics. The Authorized User will be able to demonstrate proper donning of the harness, proper usage of the equipment; and be able to identify when and where the equipment is needed. This class is geared to training the authorized persons, who are the end-users of the fall protection equipment, and teaches the proper methods for utilizing fall protection equipment at heights. Upon completion of this course, the student should:

- Understand all stages of the fall protection hierarchy.
- Know the four parts of a fall arrest system.
- Understand the fall protection training requirements and overview.
- Be able to calculate Fall Distance Calculations.
- Be able to demonstrate the proper donning of the harness, proper usage of the equipment; and be able to identify when and where the equipment is needed.
- Be able to inspect fall protection equipment.
- Know how to properly care for and maintain fall protection equipment.
- Be familiar with the effects of harness tension and pressures of the harness on the body.

This course will include the opportunity for the student to hang suspended from a harness. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Persons who attend the 3-day course Fall Protection Competent Person (SMA-SAFE-NSTC-0311-CP) should not take this course.

Target Audience: Safety professionals and others who may be involved in work where fall protection is required.

CEUs: 0.6

SMA-SAFE-NSTC-0311-CP, Fall Protection Competent Person

(3 days)

This course provides information and training for fall protection competent persons as described in the OSHA Regulations, ANSI Standards Z359.2, and NASA Policy 8715.3 and Fall Protection Training Matrix. It is designed to give students the required knowledge and skill to describe fall protection systems, components, and features, and to demonstrate the proper selection, inspection, and use of fall protection equipment and systems. This course is designed to provide classroom training to ensure the student is capable of the fall implementation, supervision, and monitoring of a fall protection program, and that they are capable of identifying, evaluating, addressing existing and potential hazards, and taking appropriate, prompt corrective action with regards to such hazards. Lesson Objectives include ensuring the student:

- Understands the fall protection requirements of NPR 8715.3 policies and procedures, ANSI Z359.0 - ANSI Z359.6, OSHA 1910 & 1926 Requirements, types of fall protection.
- Can explain hierarchy of control and identify fall protection system options.
- Can describe components of personal fall arrest systems and how to inspect, wear, and care for such systems.
- Can describe components of a guardrail system and the types of guardrails.
- Can distinguish when and how to use positioning device systems, warning line systems, and covers.
- Can determine when and how to use safety monitoring systems, controlled access zone, and safety nets.
- Can state fall protection plan requirements, including falling object protection plans.
- Can state fall protection training requirements, topics, and requirements for certification.
- Can identify situations where fall protection training is required.

This course will include the opportunity for the student to hang suspended from a harness. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience: Safety professionals and others who may be involved in monitoring, approving, or accomplishing work where fall protection is required.

CEUs: 1.8

SMA-SAFE-NSTC-0044-AU, Fall Protection Refresher for Authorized User

(4 hours)

This course provides all the information necessary to properly use, inspect, and maintain fall protection equipment on the jobsite. Also, NASA Policy, OSHA, and ANSI all require the users of fall protection equipment to have documented training adequate to qualify them as an authorized user of such equipment. This course will cover all stages of the fall protection hierarchy including, the four parts of a fall arrest system, fall protection equipment inspection, and proper care and maintenance of fall protection equipment. The student will be able to discuss proper donning of the harness, proper usage of the equipment, and be able to identify when and where the equipment is needed. This class is geared to training authorized users, who are the end-users of the fall protection equipment and ensures their understanding of the proper methods for utilizing fall protection equipment at heights. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit. Note: This class is only applicable to those who have taken SMA-SAFE-NSTC-0311-AU within the last three years or where there is a requirement as stipulated above for retraining.

Target Audience: Safety professionals and others who may be involved in monitoring, approving, or accomplishing work where fall protection is required who have taken SMA-SAFE-NSTC-0311-AU within the last three years.

SMA-SAFE-NSTC-0044-CP, Fall Protection Refresher for Competent Person

(8 hours)

This course refreshes fall protection training for competent persons as described in the OSHA Regulations, ANSI Standards Z359.2, and NASA Policy 8715.3 and Fall Protection Training Matrix and will cover any updates since attendance of the initial course (SMA-SAFE-NSTC 0311-CP). It is designed to refresh and update student's knowledge and skill to describe fall protection systems, components, and features, and to demonstrate the proper selection, inspection, and use of fall protection equipment and systems. This course is designed to provide recurrent classroom training to enhance the student's knowledge of fall implementation, supervision, and monitoring of a fall protection program, and ensure the student is capable of identifying, evaluating, addressing existing and potential hazards, and taking appropriate, prompt corrective action with regards to such hazards. This course will cover all stages of the fall protection hierarchy including, the four parts of a fall arrest system, fall protection equipment inspection, and proper care and maintenance of fall protection equipment. The student will be able to discuss proper donning of the harness, proper usage of the equipment, and be able to identify when and where the equipment is needed. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience: Safety professionals and others who may be involved in monitoring, approving, or accomplishing work where fall protection is required who have taken SMA-SAFE-NSTC-0311-CP within the last three years.

SMA-SAFE-NSTC-0312, Scaffolding Safety

(3 Days)

This course is based on OSHA CFR 1910.28 and 1926.451, requirements for scaffolding safety in the general and construction industries. During the course, discussions will focus on standards, the required training, definition and duties of a competent person, design and safety factors, terminology and inspection of scaffold components, types of scaffolds, uses of scaffolds, ladder access to scaffolds, fall protection requirements, signs and barricades, etc. When possible, the class will include a hands-on exercise in erection, inspection, and/or teardown of an actual scaffold. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors for construction and other work which uses scaffolds.
- Anyone working on operations requiring the use of scaffolds.

CEUs: 1.8

SMA-SAFE-NSTC-0316, Scaffold User's Seminar

(4 Hours)

This course is based on OSHA CFR 1910.28 and 1926.451, requirements for scaffolding safety in the general and construction industries. During the course, the student will receive an overview of those topics needed to work safely on scaffolds including: standards, terminology and inspection of scaffold components, uses of scaffolds, fall protection requirements, signs and barricades, etc. Those individuals desiring to become "competent persons" for scaffolds should take the 3-day Scaffold Safety course, SMA-SAFE-NSTC-0312. This course will primarily be presented via the NASA Videoteleconferencing system and the instructor-led version of this class will only be available if combined with another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Anyone working on operations requiring the use of scaffolds.

No CEUs available

SMA-SAFE-NSTC-0313, Cryogenics Safety

(1.5 Days)

This course is designed as a stand-alone course in cryogenics that addresses the safety requirements and potential hazards associated with processes and phenomena in the temperature region below -150°C (-238°F). OSHA, DoD, and NASA safety requirements are included as sources. The course will also cover important design and operational safety considerations for the delivery and control of cryogens (both flight and ground based systems and vessels). These considerations include materials compatibility, dimensional contraction, impact sensitivity, condensation, cleanliness requirements, purge procedures, disposal, and chill-down techniques. Please note that if you take this class, you do not need to take the Liquid Nitrogen Handler's Course (SMA-SAFE-NSTC-0314) except as a later refresher. Students taking this course will receive credit for the Liquid Nitrogen Handler's course as well.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Fluid System Design Engineers, and anyone working around or with cryogenic systems.

CEUs: 0.9

SMA-SAFE-NSTC-0314, Liquid Nitrogen Handlers' Course

(4 Hours if given as a stand-alone course, or the equivalent is the first day of the Cryogenics Safety Course, SMA-SAFE-NSTC-0313)

This course addresses the hazards of cryogenic liquid nitrogen usage and handling, and the techniques for controlling these hazards. The bases for this course include OSHA and NASA documentation and NASA applications and mishaps. The content includes: fundamentals of liquid nitrogen (physical and chemical characteristics); hazards of liquid nitrogen; safeguards for usage and handling of liquid nitrogen; safety features for storage, transfer, and transportation of liquid nitrogen; and emergency procedures and disposal of liquid nitrogen. This course will primarily be presented as part of SMA-SAFE-NSTC-0313, Cryogenics Safety or via the NASA Videoteleconferencing system and the instructor-led version of this class will only be available if combined with another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. Please note that if you take the Cryogenics Safety Course (SMA-SAFE-NSTC-0313), you should not take this class except as a later refresher.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors managing the usage and handling of liquid nitrogen, science and engineering personnel designing, planning and operating liquid nitrogen systems
- Technical personnel performing maintenance and operations for liquid nitrogen systems.

No CEUs are available for this course unless taken as part of SMA-SAFE-NSTC-0313.

SMA-SAFE-NSTC-0317, High Pressure System Operations and Flex Hose Safety

(1 Day)

This course addresses the safety requirements and potential hazards associated with the operations and maintenance of high-pressure gas systems, including flex hoses. This course will cover important operating considerations of both fixed and mobile systems. The course also addresses the need to follow written procedures, and adherence to established safety regulations. Topics included are:

- Basic concepts in the safety of high pressure systems,
- Existing safety standards for high pressure operations
- Common compressed gas properties and their safety considerations, including potential hazards such as leakage of flammable, toxic, and asphyxiating fluids/gasses,
- Component familiarization - operation of compressed gas cylinders and compressed gas trailers, flex hose use and care, and pressure vessel/systems including inspection and test requirements.

The focus of the course is on ground high-pressure gaseous systems - flight/payload systems requirements will not be discussed. This course will make maximum use of lessons learned from NASA mishaps and close calls to drive home the hazards associated with flex hoses and high-pressure system operations.

Target Audience:

- System Engineers, Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Foreman, Technicians/Operators of Pressure Systems.
- Those whose activities are associated with or come in contact with fluid systems.

CEUs: 0.6

SMA-SAFE-NSTC-0318, Safety of Compressed Gas Trailers and Compressed Gas Cylinders

(1 Day)

This course seeks to enhance the safety aspects of using, storing, and handling compressed gases. It addresses the safety requirements and potential hazards associated with compressed gas trailers and compressed gas cylinders, some common stored commodities, typical trailer and cylinder configurations and components, and their operations. The focus of the course is on the use of compressed gas trailers and cylinders as applied to small or temporary requirements to support facility needs. It covers important compressed gas storage considerations including typical components and operating procedures/hazards for filling, withdrawal, securing trailers and cylinders. These considerations include considerations for and properties of common gasses used at NASA Centers and facilities. It addresses marking, tagging, and inspection of cylinders and their components, and use of flex hoses and restraints where necessary. This course will include the use of lessons learned from NASA mishaps and close calls to drive home the hazards associated with typical compressed gas operations.

Target Audience:

- Systems/Facilities/Laboratory Engineers, Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Foremen, and Technicians/Operators of Pressure Systems
- Operators, technicians, supervisors and others who may have the occasion to inspect and/or work around/with compressed gas cylinders/trailers and/or who may write procedures including the use of compressed gas cylinders/trailers
- Others who may work around or are directly associated with compressed gas operations.

CEUs: 0.6 are available for this course

SMA-SAFE-NSTC-0320, Pressure Vessel/Systems Certification and Inspection

(1 Day)

This is a stand-alone course in Pressure Vessel/Systems (PV/S) Certification/Recertification and Inspection. The basis for this course is the requirement that each NASA Center shall implement a formal PV/S certification and inspection process that provides critical system information necessary to ensure PV/S integrity. This course will cover important operating and design considerations for Pressure Vessel/Systems. These considerations include inspection and test requirements, the certification/recertification process, and hazards (such as vessel rupture, blast effects, fragmentation, and leakage of flammable, toxic, and asphyxiating fluids/gasses) and hazard analysis. Other considerations include development of a Periodic In-Service Inspection Plan, and extensive use of Non Destructive Testing (NDT) inspection techniques. Basic concepts in the Safety of High Pressure Systems will also be discussed. The focus of the course is on ground high-pressure systems - flight/payload systems requirements will not be discussed.

Target Audience:

- Those who have ownership of Pressure Vessel/Systems (PV/S)
- Systems Engineers, Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Foreman, Technicians/Operators of Pressure Systems
- Those whose activities are associated with or come in contact with fluid systems

CEU's: 0.6

SMA-SAFE-NSTC-0037, Hydrogen Safety

(2 Days)

This course provides training on guidelines for hydrogen system design, materials selection, operations, storage, and transportation. It will cover both ground and flight systems and both liquid and gaseous hydrogen applications. The student will understand the hazardous characteristics of hydrogen and methods for controlling those hazardous characteristics and responding to emergency situations involving hydrogen. The course has been developed primarily in accordance with Guide to Safety of Hydrogen and Hydrogen Systems, ANSI/AIAA G-095-2004. It covers properties and hazards of both liquid and gaseous hydrogen, design and operations in hydrogen facilities, materials selection for use in hydrogen systems, storage vessels, piping, and component considerations, hydrogen leak and fire detection practices, operating and transportation principles and procedures, and emergency practices and considerations. Specific reference will be made to STS payload considerations.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Payload and Facility Design Engineers.
- Test Team Personnel for operations using hydrogen.
- Supervisors of and anyone working around systems using hydrogen

CEUs: 1.2

SMA-SAFE-NSTC-0054, Safety in Hydrogen System Operations

(4.0 Hours)

Safety in Hydrogen System Operations addresses the safety requirements and potential hazards associated with hydrogen systems and their operations. The course provides key concepts as presented in Hydrogen Safety (SMA-SAFE-NSTC-0037), but with special emphasis on the elements of hydrogen safety necessary for technicians and operators. The course will cover important operating considerations for hydrogen systems including: properties and hazards of both liquid and gaseous hydrogen, materials selection for use in hydrogen systems, storage vessels, piping, and component considerations, hydrogen leak and fire detection practices, operating and transportation principles and procedures, and emergency practices and considerations. This course is not available for delivery on ViTS.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Supervisors of hydrogen operations
- Provide a general understanding for anyone writing procedures for, or working with/around hydrogen systems

No CEUs are available for this course

SMA-SAFE-NSTC-0055, Hypergol Systems: Design, Buildup, and Operation.

(2 Days)

This course discusses the use of hypergols (hydrazine fuels and nitrogen tetroxide) in NASA applications. During the course, we will identify the hazards associated with the use of hypergols including: toxicity, reactivity, fire, and explosion. Management of hypergol safety risk is discussed in terms of the primary engineering controls – design, buildup, and operation; and secondary controls – personal protective equipment and detectors/monitors. The emphasis is on the buildup of compatible systems and the safe operation of these systems by technicians.

Target Audience:

- Technicians, engineers, plant managers, and operators involved in hypergol system design, buildup, operation, and maintenance
- Safety and Health Professionals involved in monitoring and evaluating the operation of hypergol systems

CEUs: 1.2

SMA-SAFE-NSTC-0052, Fire Hazards in Oxygen Systems

(2 Days – classes start at 9 AM)

Through this course, the student will learn to identify and evaluate hazards in oxygen systems. The instructors will discuss safe practices in design, materials selection, and operation of oxygen systems, as well as reviewing/providing related ASTM standards to the student. As a result of attendance, the student will: understand physical principles and empirical observations related to operations involving oxygen systems and the safe practices resulting from them; become familiar with the information needed to cope with fire hazards in oxygen systems; and become familiar with these design principles through in-class exercises. Course topics include: the need for oxygen compatibility, concepts of safety risk and safety risk management in oxygen systems/operations, ASTM Standard Guides for use with oxygen systems/operations, related ASTM test methods for combustion hazards in oxygen systems, how NASA handles oxygen compatibility, and future trends. Those who take this course should not take SMA-SAFE-NSTC-0053, Oxygen Systems: Operations and Maintenance course except as a periodic refresher.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Engineers, scientists, technicians, purchasing agents, plant managers and
- operators involved in the production and use of liquid or gaseous oxygen; or oxygen enriched gas mixtures.
- Those who supply, design, or manufacture hardware for oxygen services.

CEUs: 1.0

SMA-SAFE-NSTC-0053, Oxygen Systems: Operations and Maintenance

(4 Hours)

This course addresses topics such as oxygen compatibility, identifying and evaluating hazards in oxygen systems, managing safety risks in oxygen systems, minimizing the severity of the environment, choosing materials to withstand the environment, and good practices for oxygen systems operation and maintenance. It is specifically intended for anyone who operates or maintains any type of oxygen system. Those who take the Fire Hazards in Oxygen Systems course should not take this course except as a periodic refresher. This course is not available for ViTS delivery.

Target Audience: Technicians, plant managers and operators, and safety professionals involved in oxygen systems maintenance and operations

No CEUs are available for this course

SMA-SAFE-NSTC-0501, General Industry Safety and Health

(4.5 Days/32 Hours)

This course is intended to provide instruction on general industry safety and health topics at the introductory level. Examples of topics include an introduction to OSHA standards, lockout/tagout, confined space electrical safety, and hazard communications. CFR 1910, Occupational Safety and Health Standards, is the primary source document for this course. NASA Headquarters level safety documentation, and NASA mishap examples and experience have been integrated into the OSHA-provided course material. Preferred method of delivery for this course is via a multi-session presentation on ViTS, but it may be delivered by instructors at a center if needed. Please contact the NSTC management staff directly for determination of need/availability of the instructor-led version of this class for presentation at your location. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience: Managers, Technical Personnel, and Safety Professionals who need a basic understanding of OSHA requirements.

CEUs 2.4

SMA-SAFE-NSTC-0502, General Industry (CFR 1910) Safety and Health Overview

(10 Hours)

This course is based on the OSHA CFR 1910 course, Requirements for General Safety

and Health Provisions. It will provide a general overview of OSHA 1910 safety requirements for topics chosen by the center. Potential topics include: Introduction to OSHA, Walking and Working Surfaces, Health/Industrial Hygiene, Electrical Safety, Personal Protective Equipment, Fire Protection, Permit-Required Confined Space, Machine Guarding, Hand and Power Tools, Material Handling, and Inspections. A 10 hour General OSHA Card will be issued. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience: Managers, Technical Personnel, and Safety Professionals who need a basic understanding of General Industry OSHA requirements.

CEUs 0.8

SMA-SAFE-NSTC-0806, Confined Space Entry

(3 Hours)

The purpose of this course is to provide employees with the standards, procedures, and requirements necessary for safe entry to and operations in confined spaces. OSHA standard 29 CFR 1910.146, "Confined Space," is the basis for this course. The course covers the hazards of working in or around a confined space and the precautions you should take to control these hazards. This course will primarily be presented via the NASA Videoteleconferencing system and the instructor-led version of this class will only be available if combined with another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit. This course is only available through the NSTC at Centers other than JSC. At JSC this class is taught by Occupational Health.

Target Audience:

- Supervisors and employees required to work in confined spaces.
- Safety professionals
- Facility managers of facilities containing confined spaces.

No CEUs available.

SMA-SAFE-NSTC-0814, Lockout/Tagout

(2 Hours)

The purpose of this course is to provide employees with the standards, procedures, and requirements necessary for the control of hazardous energy through lockout and tagout of energy-isolating devices. OSHA standard 29 CFR 1910.147, "The Control of Hazardous Energy (Lockout/Tagout)," is the basis for this course. This course will primarily be presented via the NASA Videoteleconferencing system and the instructor-led version of this class will only be available if combined with another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Supervisors and Craftsmen in servicing and maintenance.
- Safety professionals.

No CEUs available

SMA-SAFE-NSTC-0076, Electrostatic Discharge (ESD) Control: Tailoring an ESD Control Program

(4 hours) (course is currently inactive)

The purpose of this course is to provide guidance in tailoring an ESD control program to the requirements of an external ESD control standard. The course can also provide guidance for projects tailoring a project plan to an ESD control standard.

This course is based largely on the JPL ESD control program, which is an implementation of JPL standard D-1348F "Electrostatic Discharge Control". The JPL ESD Control Program was tailored to comply with MIL-STD-1686 and the current ESD Association S20.20. The JPL ESD control program contains controls that are more restrictive and less restrictive than the current NASA preferred standard S20.20. Implementation of controls in the JPL standard that deviate from an external standard is the essence of the tailoring process. Topics covered include:

- The motivation for ESD Control
- Electrostatic charge generation
- Effects of electrostatic charge and discharge
- ESD control for people
- Packaging for ESD control
- Managing the ESD control program

This course is offered only on the NASA Videoteleconferencing System to one or multiple centers. Note: This course does not satisfy the NASA workmanship standard requirement for awareness of ESD control. To obtain NASA certification for ESD awareness it is necessary to attend an approved course conducted by one of the NASA workmanship training centers or be trained by a NASA certified B-level instructor. For information about certification training visit this link:

https://nepp.nasa.gov/index.cfm/14662

Target Audience:

- Mission Assurance managers, Instrument Managers, and Cognizant Engineers
- Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Electrical Design Engineers, and anyone working in circumstances where the buildup of electrostatic charge and/or its discharge may lead to hazards.

No CEUs are available for this course.

SMA-SAFE-NSTC-0077, Hazardous Locations (OSHA Standard 1910.307)

(2 Days) (course is currently inactive)

The class covers the requirements for electric equipment and wiring in locations which are classified as hazardous depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers which may be present and the likelihood that a flammable or combustible concentration or quantity is present. The class specifically addresses:

- The OSHA Requirements for Hazardous Locations found in 1910.307.
- The general requirements for these locations found in section 500 of the National Electrical Code including the Protection Techniques, and Equipment used in Hazardous Locations (T Rating of Equipment).
- The requirements Class 1 Locations (in detail): Wiring Methods and equipment used in Hazardous Classified Locations, Sealing and Drainage, Switches, Circuit Breakers, Motor Controllers, and Fuses, Motors and Generators, Lighting, Utilization Equipment, Flexible Cords, Receptacles and Attachment plugs, Signaling and Communications Systems and Grounding.
- The requirements for Class II Locations (Dust) and briefly the requirements for fibers and flyings
- The requirements for Intrinsically Safe Wiring including color-coding of conductors, control drawings and grounding.
- The requirements of NFPA 496 for purging and pressurized enclosures and NFPA 77 for controlling static electricity.

This course will be presented in-class at your center, and may be combined with SMA-SAFE-NSTC-0309, Electrical Safety Standards, into 4-1/2 days of training. The course includes lecture and demonstrations.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Supervisors, Electrical Design Engineers, and anyone working around or with electrical systems in hazardous locations.

CEUs: 0.9 or 1.2 CEUs depending on whether it is presented with SMA-SAFE-NSTC-0309, or as a stand-alone course.

SMA-SAFE-NSTC-0001, Facility System Safety

(2 Days)

This course is designed to provide attendees with an understanding of how system safety applies to facility acquisition, modification, and operations. It is based on NASA Standard 8719.7, the NASA Facility System Safety Guidebook. The guidebook will be provided to the students as part of the course material. The purpose of the course is to provide guidelines for personnel with facility safety responsibility to assist them in identifying and eliminating or controlling hazards throughout the facility life cycle. The course provides the logical framework necessary for implementing facility system safety as required by NPR 8715.3. The course also addresses facility system safety issues both from a management and engineering perspective. Topics of discussion include: a quick review of System Safety and Hazard Identification, Assessment, and Control Concepts (in the facility context); the NASA facility acquisition process and integration of system safety into it; Safety activities during facility/equipment integration & testing; and Safety management during facility/equipment operations. An in-class group exercise will be included to demonstrate facility system safety principles. Since system safety concepts will only be briefly reviewed, a prior understanding of system safety is necessary. The student should have prior system safety experience and/or have taken one of the following NSTC courses (or the equivalent):

Course Prerequisites (one or more of the following):

- System Safety Workshop (SMA-SAFE-NSTC-0008)
- System Safety Fundamentals (SMA-SAFE-NSTC-0002)
- System Safety Engineering (SMA-SAFE-NSTC-0040)

Target Audience:

- Personnel with facility safety responsibility.
- Professionals involved in managing, performing, or reviewing of facility acquisitions, plans, designs, safety analyses, & operations.

CEUs: 1.2

SMA-SAFE-NSTC-0002, System Safety Fundamentals

(4-3/4 Days)

This course instructs the student in the fundamentals of system safety management and hazard analysis of hardware, software, and operations. Basic concepts and principles of the analytical process are stressed. The student is introduced to NASA publications that require and guide safety analysis, as well as to general reference texts on subject areas covered. Types and techniques of hazard analysis are addressed in enough detail to give the student a working knowledge of their uses and how they are accomplished. Skill in analytical techniques is developed through the use of practical exercises worked by the students in class. This course establishes a foundation for the student to pursue more advanced studies of system safety and hazard analysis techniques while allowing students to effectively apply their skills to straightforward analytical assignments. Note: this course is a combination of SMA-SAFE-NSTC-0008 (System Safety Workshop) and SMA-SAFE-NSTC-0015 (System Safety Special Subjects). Students who have taken either of these classes should discuss taking this class with the NSTC management staff.

Target Audience:

- Supervisors.
- Any Technical or Non-Technical personnel who perform safety analysis and/or manage system safety programs.

CEUs: 2.8

SMA-SAFE-NSTC-0008, System Safety Workshop

(3 Days)

This course teaches the fundamentals of hazard recognition and analysis for hardware and operations. Basic hazard concepts and the basics of the analytical process are stressed. The student is introduced to NASA publications that require and guide safety analysis, and to general reference texts on subject areas covered. Types and techniques of hazard analysis are addressed in enough detail to give the student a working knowledge and provide a basis for continued refinement of analytical skills. Extensive use of in-class workshops and group exercises allow hands-on practice in techniques discussed. Note: students who have attended SMA-SAFE-NSTC-0002 should not attend this course.

Target Audience:

- Technical Interns.
- Supervisors.
- Any Technical or Non-Technical personnel who perform safety analysis or who are interested in making their hardware safe.

CEUs: 1.8

SMA-SAFE-NSTC-0011, ISS Payload Safety Review and Analysis

(4 Days)

This course is designed as a guide to the ISS payload safety review process for payload program safety and management personnel. The student will gain an understanding of payload safety as it relates to the overall ISS payload integration process, how the ISS payload safety review process works, and the roles and responsibilities of the various players in the ISS payload safety review process. In addition, the student will be instructed in the hands-on fundamentals of payload hazard analysis, identification of technical safety requirements, hazard documentation, and presentation of analyses to the Payload Safety Review Panel. The course will include a mock presentation to the Payload Safety Review Panel. Those with only support or supervisory responsibilities in payload safety should attend NSTC course 016, ISS Payload Safety Process and Requirements.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals
- Additional duty safety personnel and engineers who perform hazard analyses on ISS payloads and who must meet the safety review requirements of current ISS payload safety documents.

CEUs: 2.4

SMA-SAFE-NSTC-0016, ISS Payload Safety Process and Requirements

(8.5 Hours)

This course is intended as an overview of the requirements and will merely introduce the ISS payload safety and hazard analysis processes. It is intended for those who may be monitoring, supervising, or assisting those with the responsibility of identifying, controlling, and documenting hazards for ISS payloads. It will provide an understanding of the relationship between safety and the ISS payload integration and payload safety review processes. It also briefly describes payload safety requirements (both technical and procedural) and discusses their application throughout the payload safety process - analysis, review, certification, and follow-up to assure implementation. System safety concepts and hazard recognition will be briefly discussed and documentation requirements explained in general terms. Those with primary responsibilities in ISS payload safety should attend SMA-SAFE-NSTC-0011, ISS Payload Safety Review and Analysis.

Target Audience: Program Managers and supervisory personnel, engineering and safety staff, and others who need a general understanding of the ISS payload safety review process and primary technical requirements.

CEUs: 0.65

SMA-SAFE-NSTC-0015, System Safety Special Subjects

(2 Days)

This course is presented as a follow up to the System Safety Workshop (SMA-SAFE-NSTC-0008) for those students whose primary duties involve safety or system safety. Management aspects of system safety are discussed along with some additional analytical techniques that are not covered during the 3-day workshop. Subjects discussed include system safety implementation, and an introduction to software system safety. Students who have attended SMA-SAFE-NSTC-0002 should not attend this course.

Target Audience:

- Supervisors/Managers with safety related management duties
- Any Technical or Non-technical personnel who performs safety analysis or safety management.
- Personnel whose primary duty is system safety

CEUs: 1.2

SMA-SAFE-NSTC-0043, System Safety Seminar

(3 Hours)

This seminar serves to provide an overview of system safety origins, definitions, principles, and practices. It includes a discussion of NASA requirements for both the engineering and management aspects of system safety and answers the questions…Why should we care about system safety?; What does this mean to me?; Why do we do system safety; What is system safety; How do we do system safety? Engineering aspects will include a discussion of three typically used analytical techniques – Failure Modes and Effects Analysis (FMEA), Fault Tree Analysis (FTA), and Probabilistic Risk Assessment (PRA). Several NASA mishaps are discussed to emphasize and illuminate the system safety principles involved. This course will not serve to prepare attendees to develop or manage system safety programs or to perform specific analyses, only to introduce them to the concepts. This course has most often been given on-site at a Center during Safety Days or some other special occasion, but can be available via the NASA Videoteleconferencing system as well. This course may also be delivered in a version targeted for Managers. The instructor-led version of this class can be provided if combined with another course by the same instructor, if there are enough students to merit multiple presentations, or to meet special, urgent needs. Check with the NSTC management staff for determination. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Attendees at Center Safety Days
- Other audiences who need a quick overview of System Safety

CEUs: None

SMA-SAFE-NSTC-0040, System Safety Engineering

(5 Days – 3 and 4 day versions also available with prior coordination).

System Safety Engineering is an engineering discipline requiring specialized professional knowledge and skills in applying scientific & engineering principles, criteria, and techniques to identify & eliminate hazards, or reduce the risks associated with hazards. This training course builds on the knowledge of the safety professional or the engineering supervisor/manager, to advance their skills in techniques supporting hazard discovery, assessment and control. The course includes descriptions of methods for establishing and managing a system safety program. It also provides techniques in hazard analysis and reliability calculations. This course begins with a brief review of fundamental safety risk management concepts, but is designed primarily to provide an in-depth understanding of all aspects of system safety. Topics discussed include:

- Concepts In Risk Management
- Identification of System Safety Requirements and Implementation of a System Safety Program.
- Working With A Risk Assessment Matrix
- Preliminary Hazard Analysis (PHA)/Preliminary Hazard List
- Failure Modes And Effects Analysis (FMEA)
- Fault Tree Analysis (FTA)
- Event Tree Analysis (ETA)
- Cause-Consequence Analysis (CCA)
- Operating and Support Hazard Analysis/Writing Procedures
- Introduction To Sneak Circuit Analysis
- Introduction To Software Safety
- Human Factors

Included in this class is a series of practical exercises of increasing complexity to test the student's understanding of the concepts being presented.

Target Audience: Recommended for Managers and Engineers whose work involves recognizing and managing system safety risks

CEUs: 3.0

SMA-SAFE-NSTC-0003, Certified Safety Professional (CSP) Fundamentals Examination Review Course

(17 3-Hour Sessions) (course is currently inactive)

The CSP designation is attained through education, accumulation of experience, and examination. The CSP examination process consists of two phases: the fundamentals examination and a comprehensive practice examination. Each examination is approximately 2 hours long and they are taken on a computer at any Sylvan learning center near you. This course seeks to prepare the student for the exams to assist in attaining the CSP designation.

This study course is designed to assist students in preparing for the fundamentals exam once they have met the educational and experience requirements. The course is conducted in seventeen 3-hour segments that are designed to guide and supplement the students' individual study. The course does not teach the test, but rather guides students in learning the material and, as a result, enables them to perform their everyday jobs better as well. The course schedule is keyed to the CSP examination cycle and culminates with a mock exam. Topics include mathematics, basic and applied sciences, program management and evaluation, fire prevention and protection, equipment and facilities, industrial hygiene, environmental aspects, reliability, & system/product safety.

Target Audience: Safety professionals and others desiring to take the Certified Safety

Professional (CSP) fundamentals examination or to review basic science, math, and safety.

CEUs: 4.5

SMA-SAFE-NSTC-0026, Control Team/Crew Resource Management

(2-1/2 Days)

This training directly addresses the human factors issues that most often cause problems in team and crew interaction. No one who works in a team or on a crew, especially in high stress activities, is immune to these effects. The Control Team/Crew Resource Management course deals with interpersonal relations; but does not advocate democratic rule or hugging your fellow team members to improve personal relations. Rather, this course provides awareness of the human factors problems that too often result in mishaps and offers recommendations and procedures for eliminating these problems; with an emphasis on safety risk assessment, crew/team coordination, and decision-making in crisis situations. The two versions of this course are applicable both to those in aircrew-type operations and also to personnel operating consoles for hazardous testing or on-orbit mission operations. It is preferable that a "team" experiences the course as a group if possible. One and two-day versions of this course are also available - check with the NSTC to determine which version of the course is most applicable to your operations.

Target Audience:

- Safety Reliability, Quality, and maintainability Professionals.
- Managers, Engineers, and Technicians who work in a team environment and who must coordinate with, and depend on, others to accomplish work objectives and goals.
- All who desire to work more efficiently, effectively, and understand the dynamics of working with others.

CEUs: 1.5

SMA-SAFE-NSTC-026P, Aircrew Resource Management

(5, ½-day modules or 3 Day initial training) – Scheduled through Center Aviation Safety Officer

SMA-SAFE-NSTC-026M, Maintenance Crew Resource Management

(5-1/2 day refresher modules or 1 Day initial training) – Scheduled through Center Aviation Safety Officer

SMA-SAFE-NSTC-0029, Special Programs Seminars

(4 Hours)

These Seminars provide top-level overviews of basic tenets and practices taught in courses provided within the Special Programs portion of the NSTC Catalogue. These are tailored version of the longer class offerings designed specifically for special uses like Safety Days, etc. Previously provided seminars in this category include:

- Control Team/Crew Resource Management
- Situational Awareness

Contact the NSTC staff for further discussion on adapting an existing course to your specific needs.

Target Audience:

- Safety Reliability, Quality, and maintainability Professionals.
- Managers, Engineers, and Technicians who work in a team environment and who must coordinate with, and depend on, others to accomplish work objectives and goals.

No CEUs available

SMA-SAFE-NSTC-0034, Situational Awareness

(2-1/2 Days)

Throughout NASA there are many hazardous operations including hazardous test operations that involve operator control over systems in which component failure or operator error can threaten the safety of involved or surrounding personnel. Examples include such varied operations as hazardous testing, propellant transfers, aircraft operations, and on-orbit EVA mission operations. For such operations where extreme danger can result from system failure or operator error, a body of knowledge, called situational awareness, has been developed to promote safe outcomes from potentially hazardous events. Situational awareness involves combining an awareness of what's going on in the operations environment, knowledge of system failure design criteria, and an understanding of expected outcomes from system failures to avoid hazardous situations and develop safe responses to unsafe conditions that may realistically be expected to arise. This course instructs students in the basic tenets and practices of situational awareness, and how they apply to hazardous operations in NASA in order to promote the best proactive safety techniques in practice. This course may be presented in conjunction with Control Team/Crew Resource Management.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals.
- Those involved as test/operations team members in hazardous operations.
- Anyone designing, writing procedures for, or supervising those working in hazardous test or mission operations.

CEUs: 1.5

SMA-SAFE-NSTC-0074, Range Safety Orientation

(2 Days)

NASA operates and uses ranges to launch, land, and test space vehicles, aeronautical vehicles, and associated technologies. These missions can pose significant hazards and safety risks with respect to life, health, and property. This course is designed to give the NASA senior, program, and project managers an understanding of the Range Safety mission, associated policies and requirements, and NASA roles and responsibilities. It introduces the students to the major ranges and their capabilities, defines and discusses the major elements of Range Safety (flight analysis, flight termination systems, range operations), and briefly addresses associated range safety topics such as ground safety, frequency management, and uninhabited aerial vehicles (UAVs). The course emphasizes the principles of safety risk management to ensure the public and NASA workforce are not subjected to risk of injury greater than their normal day-to-day activities. It is designed to inform the audience of the services offered by the Range Safety organization, present timeframes that allow adequate interface with Range Safety during Program/Project startup and design to minimize potential delays and costs, and recommend ways of making the working relationship with Range Safety most beneficial for the Range User. This course includes a visit to range safety facilities at CCAFS/KSC and will normally only be given at this location.

Target Audience:

- Senior, program, and project managers
- Safety, Reliability, Quality, and Maintainability Professionals with an interest in range safety activities

CEUs: 1.2

SMA-SAFE-NSTC-0078, Mission Assurance for On-Orbit Spacecraft Operations Overview

(1 Day) (class is currently inactive)

A large portion of the NASA mission includes the development, launch, and operations of manned and unmanned spacecraft and satellites. One of the primary responsibilities in this mission is performing analyses to identify and mitigate public and other risk associated with orbital operations. This course is designed to give the student an understanding of orbital safety requirements and analysis. It includes multi-agency requirements for space safety analysis and introduces students to various models and tools used to perform or aid in the analyses. It introduces the students to topics such as: mission planning of on-orbit safety, end-of-life considerations, on-orbit hazards, the orbital environment, conjunction assessments and collision avoidance planning, NASA roles and responsibilities, and interactions with other agencies. It is designed to make the audience aware of such program requirements, and present suggested timeframes that allow adequate consideration of space safety during Program/Project startup and design to minimize potential delays and costs. .

Target Audience:

- Senior, program, and project managers
- Safety, Reliability, Quality, and Maintainability Professionals with an interest in space safety activities

CEUs: 0.6 or 1.0 (with field trip)

SMA-SAFE-NSTC-0079, Mission Assurance for On-Orbit Spacecraft Operations – Analysis Level

(2 Days) (class is currently inactive)

A large portion of the NASA mission includes the development, launch, and operations of unmanned spacecraft. This NSTC course provides an overview of NASA policies and requirements for such vehicles with emphasis on mission assurance during on-orbit operations and the overall safety of the unmanned spacecraft mission. It is designed to give NASA personnel who conduct operations with on orbit systems and those reviewing the risks associated with orbital operations, the associated policies and requirements, and NASA roles and responsibilities. Topics covered include:

- Mission Planning for On-orbit Mission Success (policies and practices) - interference, RFI, MIJI, lasers, system safety and design issues, preliminary and critical reviews, operator inputs, and end-of-life concerns
- Orbital Debris Issues
- Reentry Procedure Risk Management
- Safety and Hazard Reporting Policy
- Orbital environment/solar weather
- Conjunction Assessment – tools and common products
- Collision Avoidance (COLA) Tools, Common Products, and Actions
- Information exchanges with commercial, other nations, and DoD as updated using the AFSPC CFE Program
- Orbital and Launch Safety exchange with AFSPC, FCC, and FAA
- On-orbit Space Flight Plan risk management
- Crew Management and Human Factors

Target Audience:

- Personnel who conduct operations with on orbit systems
- Orbital Safety Representatives
- NASA, FAA and DoD Space Mission Assurance Representatives
- Other personnel associated with Space Safety and Analysis
- Program/project managers and engineers who design systems for space operations

CEUs: 1.2

SMA-SAFE-NSTC-0084, Hazardous Waste Management

(2 Days)

This course is intended for all employees handling and managing hazardous materials and/or waste. The course can be customized and incorporates hazardous waste generator requirements; segregation, labeling; container management; Department of Transportation (DOT) requirements; and waste shipment. The program instructs employees how to perform their duties in compliance with the Environmental Protection Agency (EPA) 40 CFR 262 generator standards and Department of Transportation (DOT) 49 CFR 172/173. Day one of our program provides the DOT training and day two provides the Hazardous Waste Management training.

Target Audience:

- Safety and Industrial Hygiene Professionals.
- Others involved in handling and managing hazardous materials and/or waste.

CEUs: 1.2

SMA-SAFE-NSTC-0085, Hazardous Waste Management Refresher

(1 Day)

This course is intended as refresher training for all employees handling and managing hazardous waste. The course can be customized and incorporates hazardous waste generator requirements; segregation, labeling; container management; Department of Transportation (DOT) requirements; and waste shipment. The program instructs employees how to perform their duties in compliance with the Environmental Protection Agency (EPA) 40 CFR 262 generator standards and Department of Transportation (DOT) 49 CFR 172/173.

Target Audience:

- Safety and Industrial Hygiene Professionals.
- Others involved in handling and managing hazardous materials and/or waste.

CEUs: 0.6

SMA-SAFE-NSTC-0086, Expendable Launch Vehicle Range Safety Analysis

(4 Days)

One of the primary roles of the Range Safety staff is to perform flight analyses to identify and mitigate public risk associated with range operations. This course is designed to give the student a detailed understanding of ELV range safety analysis. While providing an overview of NASA and FAA requirements, this course focuses on Air Force Space Command (AFSPC) requirements for flight safety analysis; a discussion of range operations hazards, risk criteria, and risk management processes; and an in-depth coverage of the containment and risk management analyses performed for expendable launch vehicles (ELVs) at the Eastern Range. The course concentrates on debris hazards and analyses but includes an overview of toxic, blast and radiation analyses. The course includes a class exercise that covers the entire analysis process. Prerequisite for attendance at this course is prior attendance at SMA-SAFE-NSTC-0074, Range Safety Orientation, or equivalent experience – engineering degree and a familiarity with range safety.

Target Audience:

- NASA, FAA and DoD Range Safety Analysts in training
- Range safety personnel in other disciplines
- Program/project managers and engineers who design potentially hazardous systems to operate on an AFSPC range
- Personnel who conduct hazardous operations on an AFSPC range

CEUs: 2.4

SMA-SAFE-NSTC-0087, Particle Count Training

(2 hour)

This two-hour course will provide the technician/engineer with the basic skills and knowledge for performing a particle count for determination of particle cleanliness level. A written/practical examination will also be offered. Course content includes:

- Review of approved method for manually counting particles using an optical microscope
- Microscope operation and calibration
- Non-microscopic visual identification of particles by shape, size, color, and other physical characteristics
- Sampling techniques for particles in gases and liquids
- Filtering techniques for fluid using Millipore apparatus
- Compatibility of filter membrane and their specific uses
- Handling filter membranes, Millipore assembly, performing background determinations, pre-reading of filters prior to sampling
- Use of high pressure filter assemblies
- Particle counting and data recording
- Statistical analysis
- Use of automatic particle counting techniques and their limitations.

There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Technicians and engineers working in or around clean rooms.
- Others involved in handling and managing clean room activities.

CEUs: None

SMA-SAFE-NSTC-0088, Cleanroom Protocol and Contamination Control

(2.5 hours)

This course addresses the operation and uses of cleanrooms and the associated cleanroom protocols to minimize contamination. The student will learn how to prevent contamination from spreading to the product or test article in and upon removal from the clean environment. The class will include a discussion of contamination control and cleanroom requirements documents, including JPR 5322.1 Rev G and ISO 14644. The course discusses the nature and sources of contaminants, monitoring particle and film contamination, cleanroom protocols to prevent the spread of contamination, and contamination removal methods. Also included are: NASA requirements for cleanliness levels; Identification and monitoring of contamination; classifications of cleanrooms; personnel and garment protocols in cleanrooms and clean work areas; and Removal methods. There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Technicians and engineers working in or around clean rooms.
- Others involved in handling and managing clean room activities

CEUs: None

SMA-SAFE-NSTC-0095, Practices and Guidelines for Cleanroom and Related Operations

(2 Hours)

This course will provide the technician/engineer practical guidelines to modern cleanroom practices. The formal instruction will include:

- Cleaning the cleanroom
- Cleanroom monitoring methods and practices
- Cleanroom entry and exit
- Laminar flow bench
- Garment protocols
- Techniques for wiping
- Personnel disciplines

There will be a final exam associated with this course which must be passed with a 70% minimum score to receive course credit.

Target Audience:

- Technicians and engineers working in and around cleanrooms.
- Safety, Reliability, Quality Assurance, and other personnel involved in monitoring, handling and managing cleanroom activities.

CEUs: None

SMA-SAFE-NSTC-0096, NASA Flight Safety Systems

(3 Days)

The Flight Safety Systems (FSS) Course describes FSS responsibilities and Flight Termination System (FTS) design, test, performance, implementation, analysis and documentation requirements. The course also includes a review of Uninhabited Aerial Vehicle (UAV) flight termination systems, balloon universal termination packages and the Enhanced Flight Termination System (EFTS). The FSS class will conclude with a description of the Autonomous Flight Safety System (AFSS), and a tour of the Naval Ordinance Test Unit (NOTU) when the class is held at Kennedy Space Center.

Prerequisites:

1. Completion of SMA-SAFE-NSTC-0074, Range Safety Orientation, or equivalent level of experience or training, is required
2. Completion of SMA-SAFE-NSTC-0002, System Safety Fundamentals, or SMA-SAFE-NSTC-0008, System Safety Workshop, is recommended

Target Audience:

- NASA, FAA and DoD Range Safety Personnel working Flight Safety Systems issues
- Range safety personnel in other disciplines
- Program/project managers and engineers who design potentially hazardous systems to operate on a range
- Personnel who conduct hazardous operations on a range

CEUs: 2.4

SMA-SAFE-NSTC-0097, Range Safety Operations

(5 Day)

To ensure mission success and safe operations for the range, a formal process has evolved among the different ranges to provide range safety operations. This course addresses the roles and responsibilities of the Range Safety Officer for range safety operations as well as real time support, including pre-launch, launch, flight, re-entry, landing, and any required mitigation. Mission rules, countdown activities, and display techniques are presented. Additionally, tracking, telemetry and vehicle characteristics are covered in detail. Finally, post operations, lessons learned, and the use and importance of contingency plans are presented. Those participating in the course receive hands-on training and exercises to reinforce the instruction. Personnel must have attended SMA-SAFE-NTSC-0074, SMA-SAFE-NSTC-0086 and SMA-SAFE-NSTC-0096 and/or be familiar with Range Safety Operations at WFF and DFRC.

Target Audience: Anyone identified as needing initial training for future/current employment as a Range Safety Officer within NASA, or personnel in the management chain responsible for oversight of Range Safety Officers.

CEUs: 3.0

SMA-SAFE-NSTC-0098, NASA Range Flight Safety Analysis

(4.5 days)

One of the primary roles of the Range Safety staff is to perform flight analyses to identify and mitigate public risk associated with range operations. This course is designed to give the student an overview of NASA methods in conducting range safety analysis. While providing an overview of FAA and DoD requirements, this course focuses on NASA requirements for flight safety analysis; a discussion of range operations hazards, risk criteria, and risk management processes; and coverage of the containment and risk management analyses performed for unguided vehicles (sounding rockets, balloons, etc.), Unmanned Aircraft Systems (UAS), Expendable Launch Vehicles (ELVs), and other unique flight vehicles at NASA Centers across the country. The course concentrates on debris hazards and analyses but includes an overview of toxic, blast and radiation analyses. The course includes class exercises throughout. Prerequisite for attendance at this course is prior attendance at SMA-SAFE-NSTC-0074, Range Safety Orientation, or equivalent experience – engineering degree and a familiarity with range safety. Note: This course will be available via a SATERN video capture (course number to be determined). Please contact Alan Dumont, alan.g.dumont@nasa.gov, to discuss this SATERN video course or for potential instructor-led delivery of this course.

Target Audience:

- NASA, FAA and DoD Range Safety Analysts in training
- Range safety personnel in other disciplines
- Program/project managers and engineers who design potentially hazardous systems to operate on a NASA range
- Personnel who conduct hazardous operations on a NASA range

CEUs: 2.8

SMA-SAFE-NSTC-0828, Process Safety Management (PSM) and the Hazard and Operability Analysis (HAZOP) Methodology

(2 Days)

This course is designed to provide the student an understanding of the OSHA 1910.119, Process Safety Management requirements for NASA operations and the use of the HAZOP methodology in satisfying those requirements in the analysis of processes and facilities at NASA. Topics to be discussed will include: Background for Process Safety Management; Overview of OSHA 1910.119, Process Safety Management Requirements; HAZOP Process; HAZOP Team Make-up and Selection, Roles, and Responsibilities; Meeting Management; HAZOP Process Tailoring and Node Selection; Use/Tailoring of Guidewords; Hazard Analysis, Safety Risk Assessment, and Hazard Tracking. The course includes both lecture and in-class, group exercises to familiarize students with PSM requirements, the HAZOP methodology, and HAZOP meeting dynamics.

Target Audience:

- Safety, Reliability, Quality, and Maintainability Professionals responsible for Process Safety Management activities.
- Safety and Facility Engineers who may be asked to perform a HAZOP
- analysis or be members of a HAZOP team.
- Facility and Process Operators who may be asked to perform a HAZOP analysis or be members of a HAZOP team.

CEUs: 1.2

SMA-SAFE-NSTC-0851, Adult CPR

(3.0 Hours)

This class is designed to help participants learn how to respond to a breathing or cardiac emergency in an adult. Students will become familiar with signals of breathing emergencies, signals of cardiac emergencies and the subsequent care for suffering victims. The participants will be able to demonstrate how to care for a person who is not breathing, who is choking, or who is in cardiac arrest. The course also covers general "emergency responder" techniques and how best to help in an emergency situation. Class does not include training on the use of an AED. Look for scheduled offerings of this course provided at your Center.

Target Audience: Anyone with an interest in or need for accomplishing CPR.

No CEUs are available for this course

SMA-SAFE-NSTC-0854, Standard First Aid

(1 Day)

This is an American Red Cross Workplace training course, designed to help participants become familiar with recognizing and appropriately responding to emergencies. Students will learn 'emergency action steps' which will guide them in caring for victims of sudden illness or injury – including breathing and cardiac emergencies. Students will become familiar with the signals of sudden illnesses and learn skills to provide care, until professional help arrives. They will also learn how to protect themselves and overcome obstacles that may influence their decision to help in an emergency. New techniques in administering CPR and First Aid, per 2006 standards, are included in the training. Students will work with each other and manikins, to practice emergency response skills. Students who successfully pass skill and written tests will receive an American Red Cross certification card for Standard First Aid. CPR certification is good for one year - First Aid portion is good for 3 years. Objective of the course is to help people feel more confident of their ability to help in an emergency.

Target Audience: Anyone with an interest in or need for accomplishing First Aid and/or CPR.

CEUs: 0.6

Mishap Investigation and Root Cause Analysis

SMA-SAFE-NSTC-0018A, Investigating Aircraft and Flight System Mishaps

(3 Days)

This course provides instruction in aviation and flight systems mishap investigation basics and policy. Topics discussed include: NASA NPR 8621.1 mishap investigation requirements and terminology, investigator qualifications, board composition and field techniques. Evidence identification, recovery and protection, witness interviewing and site mapping along with individual component systems and material failures are key areas discussed during sessions on field investigation. The course contains extensive accident investigation information generally applicable to aviation accidents which can be applied to other areas of flight systems mishaps, such as unmanned aerial vehicles, rockets, balloons, and other space flight systems mishaps such as Genesis.

Prerequisites:

- SATERN Web-based training on Mishap Investigation

Target Audience:

- Mishap Investigation Team Members and Mishap Investigation Board Members.
- Engineers and safety staff in positions to be assigned to aircraft and flight system mishap investigations.
- Ground Operations Management personnel.
- Rapid Response personnel.

CEUs: 1.8

NSTC courses are listed on SATERN in the SMA domain. The most current course descriptions will be in SATERN. All NSTC classes will be scheduled in the SMA domain using SATERN and all students will be required to sign up for classes in SATERN in order to receive credit for course attendance. For further information, please contact:

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