UPDATED: 4/4/2023

# NRC Sponsored Training Courses Available to Agreement State and Master Material Licensee Students

## COURSE DESCRIPTIONS

### Health Physics for Uranium Recovery (F-104)

This is a 4.5-day course that includes at least one tour of a uranium mine/milling facility after three days of instruction by a contractor, ORAU, that conveys a fundamental understanding of health physics for uranium recovery facilities. Health physics practices and issues for uranium mining, milling, and in-situ leach extraction type facilities are discussed. Topics include: brief review of radiation units and terminology; naturally-occurring radioactive decay chains; special properties and hazards of uranium and its decay products; general facility descriptions; radiation issues and hazards involving radon-222 releases and windblown tailings; radiation dose limits, including the weekly limit for soluble uranium; working level concept for radon decay products; contamination control, including instrumentation and scan MDCs; external dose controls; and internal dose controls, including bioassay and air sampling programs. The course includes speakers from the NRC and Agreement State(s) in addition to presenter(s) from ORAU. This provides the attendees with an up-to-date status within the Agreement State and specific details of uranium recovery activities. The course is typically conducted at an Agreement State facility. Once scheduled, the address will be provided.

**Exam:** Multiple choice - 70% passing
**Mobile:** Yes

### Inspection Procedures (G-108)

This course provides an understanding of materials related health physics inspections. Course topics include: how to prepare for, schedule, and conduct a routine inspection; enforcement; inspection documentation; incident inspections and handling allegations. The main portion of the course is devoted to inspection of the following licensees; medical, R&D, industrial radiography, gauges, well logging, irradiators. A mock inspection exercise is conducted. Although not required, attendees will get the maximum benefit from this Regulatory Skills course if they have previously attended the following technology courses so that they will better understand the licensing concepts discussed. At a minimum, familiarity with the terminology and activities conducted in these areas is strongly recommended. Material covered in the Inspection Course will assume either some basic understanding of the concepts presented in these courses or experience with the activities being inspected: Diagnostic and Therapeutic Nuclear Medicine (H-304); Brachytherapy, Gamma Knife and Emerging Technologies (H-313); Safety Aspects of Industrial Radiography (H-305).

**Exam:** No (team inspection and oral briefing)
**Mobile:** Yes

**Licensing Practices and Procedures (G-109)**

This course covers licensing procedures for portable and fixed gauges, medical applications, academic/R&D, well logging, irradiators and industrial radiography. The course includes 4 - 8 hours of self-study material that is provided to students prior to the course. The self-study allows students to learn general concepts that they will be expected to apply during licensing exercises that are conducted throughout the classroom portion of the course. Lectures and exercises are provided by Senior NRC License Reviewers. Although not required, attendees will get the maximum benefit from this Regulatory Skills course if they have previously attended the following technology courses so that they will better understand the licensing concepts discussed:

- Diagnostic and Therapeutic Nuclear Medicine (H-304)
- Brachytherapy, Gamma Knife and Emerging Technologies (H-313)
- Safety Aspects of Industrial Radiography (H-305)

At a minimum, familiarity with the terminology and activities conducted in these areas is strongly recommended. Material covered in the Licensing Course will assume either some basic understanding of the concepts presented in these courses or experience with the activities being licensed.

**Exam:** No (team activities)
**Mobile:** Yes

**Root Cause Workshop (G-205)**

*****IMPORTANT*****
**This course has been overhauled and is currently being presented as either onsite, instructor-led, or via a virtual classroom. Please pay particular attention to the location of the course session details to ensure you know which type of course session is being advertised.**

**1. Location**
In-person course sessions are generally offered at the TTC.
Virtual course sessions will be delivered using MS Teams.

**2. Course Schedule**
The in-person course sessions have returned to a five-day learning experience (Monday - Friday).
Typical in-person course schedule will be:

Monday 8 am - 5 pm local time
Tuesday 8 am - 5 pm local time
Wednesday 8 am - 5 pm local time
Thursday 8 am - 5 pm local time
Friday 8 am - 2 pm local time

The virtual course sessions are also a five-day learning experience (Monday - Friday), BUT please note the delayed shift in start and end times to accommodate western time zones.
Typical virtual course schedule will be:

Monday 9 am - 6 pm eastern time
Tuesday 9 am - 6 pm eastern time
Wednesday 9 am - 6 pm eastern time
Thursday 9 am - 6 pm eastern time
Friday 9 am - 6 pm eastern time

**3. Description**
This 5-day workshop provides attendees with an introduction to root cause analysis techniques, events and causal factors analysis, interviewing witnesses, failure recognition, fault-tree analysis, change analysis, energy (hazard)-barrier-target analysis, safety culture and personnel reliability, MORT analysis, determining extent of cause and condition, assembling facts and conclusions to build a defendable argument (oral briefing) and writing root cause statements. Emphasis is placed on information gathering and conducting interviews. Case studies are used to illustrate methods, foster teamwork, and practice interviewing and briefing techniques.

**4. Related Curricula:** G-204 (Root Cause Report Evaluation) and G-203 (Root Cause Report Evaluation for Supplemental Inspections).
**5. Who Should Attend:** Personnel who are required to take this course as part of their formal qualification program and those who wish to increase their knowledge of the subject matter. Priority enrollment will be given to staff pursuing formal qualifications that require this course as part of their primary position with the agency.

**Exam:** No (preparation of a team report and an oral briefing is required)
**Mobile:** Yes

**Characterization and Planning for Decommissioning Self-Study Course (H-115S)**

The Characterization and Planning for Decommissioning Self-Study Course (H-115S) provides an overview of various decommissioning planning tools and activities. Specific topics include: statistical concepts used in decommissioning; survey design and implementation; sampling instrumentation and equipment; data quality objectives; and decision making processes involved in the historical site assessment, scoping survey, and characterization survey phases of decommissioning. Throughout the course, you will complete multiple interactive planning activities and tasks associated with a hypothetical site undergoing decommissioning. Many of the course topics and activities are based on the standard guidance found in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). Because the course involves highly technical content and exercises that ultimately build towards the complete characterization of a site, it is suggested that students take 1-2 weeks to focus on this course exclusively and work through it from start to finish.

**Exam:** Multiple choice - 70% passing
**Mobile:** NA

**Introductory Health Physics Self-Study Course (H-117S)**

This course involves self-paced study of 13 eLearning instructional modules and an online exam that requires a grade of at least 70% to receive credit for the course.

This introductory course provides a basic understanding of health physics and radiation protection principles. Furthermore, this course provides an overview of the various uses of radioactive material in industry and discusses the history of health physics. All module titles are provided below:

Introductory Health Physics Video Timeline
Module 1 - Understanding Radiation and Radioactivity
Module 2 - Radiation Sources
Module 3 - Measuring Radiation Sources
Module 4 - Measuring Our Exposure to Radiation
Module 5 - Instruments to Detect and Measure Radiation
Module 6 - Uses of Radiation in Medicine
Module 7 - Uses of Radiation in Industry and Consumer Products
Module 8 - Nuclear Power
Module 9 - Radiation Protection (Health Physics)

Module 10 - Radiation Effects on Living Cells and Organisms
Module 11 - Radiation Dose and Risk
Module 12 - Monitoring Radiation in the Environment
Module 13 - Transport of Radioactive Materials

**Exam:** Multiple choice - 70% passing
**Mobile:** NA

**MARSAME: Multi-Agency Radiation Survey and Assessment of Materials and Equipment (H-120S)**

This online course involves self-paced study of 13 eLearning instructional modules (titles provided below) and includes an online exam. A grade of 70% is required to receive credit for the course. This course provides students with an overview and basic understanding of the methodology described in the Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (NUREG-1575, Suppl. 1), known as MARSAME. The course both reviews the basic concepts and principles described in the MARSSIM Manual (NUREG-1575), and highlights the differences in MARSAME. Preliminary surveys, action levels, survey designs, uncertainty, and statistical decision-making are discussed in detail. Throughout the course, students work example problems demonstrating individual aspects of MARSAME, which lead to a final class exercise that develops a MARSAME plan for a site on which various items were stored pending final disposition. Students are expected to have some familiarity with the MARSSIM methodology.

Module Titles:
1. MARSAME Overview
2. Initial Assessment
3. Decision Inputs (Part 1)
4. Decision Inputs (Part 2)
5. Statistical Concepts in MARSAME
6. Measurement Uncertainty
7. Measurement Detectability and Quantifiability
8. Survey Designs
9. Statistical Sampling
10. Measurement Techniques and Instrumentation
11. Implementing the Survey
12. Data Quality Assessment
13. Drawing Conclusions from the Survey.

**Exam:** Multiple choice - 70% passing
**Mobile:** NA

**MARSSIM: Multi-Agency Radiation Survey and Site Investigation (H-121S)**

This online course involves self-paced study of 27 eLearning instructional modules (titles provided below) and includes an online exam. An exam grade of 70% is required to receive credit for the course. This course provides students with a familiarization of the methodology described in the Multi-Agency Radiation Survey and Site Investigation Manual (NUREG-1575, Revision 1), known as MARSSIM. The course reviews the theory and implementation of MARSSIM. It emphasizes the decision-making processes involved in the design and implementation of a MARSSIM-based decommissioning survey. Topics include an overview of radiological survey types, the data quality objectives process, background reference area selection, survey instrument detection sensitivity, area classification, and survey statistical design. Significant statistics and calculations are associated with the successful completion of this course.

Module Titles:

1. MARSSIM Overview, Part 1
2. MARSSIM Overview, Part 2
3. MARSSIM Overview, Part 3
4. MARSSIM Overview, Part 4
5. MARSSIM Overview, Part 5
6. Radiological Survey Types in Support of Decommissioning
7. Derived Concentration Guideline Levels, Part 1
8. Derived Concentration Guideline Levels, Part 2 - Multiple Radionuclides
9. Derived Concentration Guideline Level, Problem Set
10. RESRAD Overview
11. RESRAD-BUILD Overview
12. Decontamination and Decommissioning (DandD) Overview
13. Visual Sample Plan (VSP) Overview
14. Classification and Survey Units
15. Reference Areas
16. Surface Activity Assessment and Detection Sensitivity of Survey Instrumentation
17. Statistical Design of Final Status Surveys
18. Final Status Surveys (FSS) - Wilcoxon Rank Sum (WRS) Test
19. Final Status Surveys (FSS) - Sign Test
20. Integrated Final Status Survey
21. Performing the Statistical Tests
22. Data Quality Assessment, Power Curves, and the Assessment of Multiple Radionuclides
23. Evaluating the Cushing Data Set
24. Special Survey Issues
25. Indistinguishable from Background, Part 1 - Planning and Evaluation of Background
26. Indistinguishable from Background, Part 2 - Evaluation of Survey Unit Measurements
27. Final Status Survey Reports (FSSR)

**Exam:** Multiple choice - 70% passing
**Mobile:** NA

**Fundamental Health Physics Labs Course (H-122 Labs)**

This 4.5-day course is held at the NRC's Technical Training Center and is composed entirely of hands-on activities and exercises that allow students to apply the knowledge they have learned in the H-122S self-study course. In order to register for this lab course, students must first have completed the H-122S course.

This course is one element in the NRC's Fundamental Health Physics (H-122) training. The Fundamental HP training consists of two parts and is considered a "blended learning" course. The two parts of the training include:

1) 45 self-study modules and three exams, which must be completed online (H-122S), and
2) The 1-week of lab activities that are delivered at the NRC's Technical Training Center (H-122L).

Together, the successful completion of H-122S and the H-122L will complete the Fundamental HP training requirements.

Please be aware that access to the online course modules requires registering for the Fundamental Health Physics Self-Study Course (H-122S), which is a separate course in TMS.

**Exams:** No
**Mobile:** No

**Environmental Monitoring and Air Sampling for Radioactivity Self-Study Course (H-130S)**

This self-study course is one component of a blended curriculum that has replaced the two following NRC training courses:

- H-111, Environmental Monitoring for Radioactivity
- H-119, Air Sampling for Radioactive Materials

The two courses listed above **are no longer offered.** If you require these courses, completion of the new *Environmental Monitoring and Air Sampling for Radioactivity* training curriculum will give you credit for **both of these courses**. The new training curriculum includes the following components:

1. The 26 self-study modules and final exam associated with this self-study course (H-130S), and
2. A 3.5-day lab course that is delivered in person by a contractor (H-130L).

The successful completion of both the H-130S and the H-130L courses is required.
As noted above, the online H-130S course involves self-study of 26 instructional modules and an online exam. An exam grade of 70% is required to receive credit for the course.

Please be aware that registering for this self-study course (H-130S) does not register you for the H-130L Lab course. That is a separate course in TMS. You must complete this self-study course prior to registering for the lab course.

The online modules within this course include information on the following topics:

- Introduction to Environmental Surveillance and Monitoring Programs
- Environmental Standards and Regulations
- Introduction to Radionuclide Pathways in the Environment
- Direct Radiation Measurements
- Air Sampling
- Air Sampling Equations
- Stack Sampling
- Continuous Air Monitors (CAMs)
- Radon and Its Decay Products
- Occupational Air Sampling/Air Sampling in the Workplace
- Airborne Particle Sizing
- Soil Sampling
- Sediment Sampling
- Water Sampling
- Sampling Biota and Food Products
- Effluent Monitoring
- Emergency Response Sampling
- Decontamination and Decommissioning Sampling

**Exam:** Online exam (70% or better required for passing)
**Mobile:** NA

**Environmental Monitoring and Air Sampling for Radioactivity Lab Course (H-130L)**

This 3.5-day course is delivered by Oak Ridge Associated University staff in Oak Ridge, TN. It is composed entirely of hands-on activities and field exercises that allow students to apply the knowledge they have learned in the H-130S self-study course. In order to register for this lab course, students must first have completed the H-130S course.

This lab course is only one part of the *Environmental Monitoring and Air Sampling for Radioactivity* training curriculum. The training consists of two parts, and is considered a "blended learning" course. The two parts include:
1) 26 online modules and a final exam included in a self-study course (H-130S), and
2) This 3.5-day lab course that is delivered in person (H-130L)

The successful completion of the H-130S online course is required prior to attending this course. Instructions for registering in the online course are included in the H-130S course description.

**NOTES:** Priority enrollment is given to those who need this course to fulfill a formal qualification program.
The new *Environmental Monitoring and Air Sampling for Radioactivity* training curriculum has replaced the two following NRC training courses:

- H-111, Environmental Monitoring for Radioactivity
- H-119, Air Sampling for Radioactive Materials

The two courses listed above **are no longer offered.** If you require these courses, completion of the H-130S and the H-130L together will give you credit for **both of these courses**.

**COURSE LOCATION:** The course is conducted at a contractor's facility. The address is:
Oak Ridge Institute for Science and Education (ORISE)
Intersection of Bethel Valley Road and Pumphouse Road
Oak Ridge, TN 37830
(Google Maps location - 35.983667 -84.222)

**Exam:** No exam (course is entirely lab and field activities)
**Mobile:** No

**Advanced Health Physics (H-201)**

This is the final course in the NRC Health Physics Series of courses. This intensive 4.5-day course provides a detailed understanding of health physics principles through calculations associated with complex problems. The course includes technical topics such as: methods for estimating external dose to the body and skin; serial decay; neutron activation; point, line and area source calculations; shielding design; use of portable survey instruments and air samplers; implementation of approved methods for quantifying effective dose equivalent from external sources; methods for calculating dose from submersion; and health physics statistics.

An understanding of basic and mid-level mathematical concepts such as exponentials, logarithms and inverse tangents is required. A hand-held calculator with exponential, logarithmic and trigonometric functions is required to be brought to class. Also, it is strongly recommended that you bring your own laptop or other device to the course to allow review of the course materials outside of the classroom. Please note that the likelihood of success is significantly increased if the items listed above are satisfied. If you have any questions regarding the level of difficulty of this course please contact the Course Director at the Technical Training Center. Priority enrollment is given to those who need this course to fulfill a formal qualification program.

***** Prior completion of the Fundamental HP Self-Study Course (H-122S) is now required to register for this course. H-122S must be completed at least *four weeks* before the scheduled offering of H-201. Students who have previously completed the Applied Health Physics (H-109) course are waived from this pre-requisite.*****

**Exam:** Long Answer (word problem) Exam – 70% passing
**Mobile:** Yes

**Health Physics Statistics Self-Study Course (H-301S)**

This course involves self-paced study of 12 online instructional modules and an online exam that requires a grade of at least 70% to receive credit for the course.

The Health Physics Statistics Self-Study Course (H-301S) will introduce you to various applications of statistics to operational health physics. The topics that are covered in the course include an introduction to basic statistical concepts, descriptive statistics, uncertainty propagation, hypothesis testing, and selection of statistical tests. The course includes practical exercises, introduces statistical software applications, and provides additional references if you would like to dive deeper in a given subject area. The applied health physics problems and exercises that are provided will illustrate the application of statistics to environmental monitoring, effluent release, site assessment, laboratory applications, and dosimetry.

The course itself is made up of 12 self-study modules that will cover the topics discussed above. At the end of each module, there are knowledge check questions for you to complete. It is highly recommended that you complete the knowledge checks for each module, although it is not required. The results are not tracked, but provide valuable insight into what you can expect in the course exam.

**Exam:** Online exam (70% or better required for passing)
**Mobile:** NA

**Safety Aspects of Industrial Radiography (H-305)**

*****IMPORTANT*****
**This course is currently being presented as either onsite, instructor-led, or via a virtual classroom. Please pay particular attention to the location of the course session details to ensure you know which type of course session is being advertised.**

This 4.5-day course provides an understanding of radiography principles, sources, techniques and equipment, regulatory and licensing requirements for radiographic activities, regulatory requirements for handling, storing, shipping and transporting radiography sources, radiography incidents, inspection techniques for radiography activities, and field industrial radiography operations. Opportunities are provided for hands-on experience. This course is conducted by a radiography camera manufacturer and multiple tours are provided of their facilities. Also, licensed radiographers are brought in to perform actual radiographs. Although no significant dose is expected, students are encouraged to bring their own dosimetry to the course. The contractor will also provide dosimetry.

Please note that firearms are NOT permitted on any of the sites where training will be conducted.

**For the virtual classroom version of this course, additional information will be sent to enrollees at least one week before the course begins.**

**For the onsite, instructor-led version of this course, it is taught by a contractor at the following location:**
Source Production & Equipment Co., Inc.
113 Teal Street
St. Rose, LA 70087

**Prerequisites: It is highly recommended that you complete the Fundamental Health Physics Self-Study Course (H-122S) prior to attending this course.**

**Exam:** Multiple choice - 70% passing
**Mobile:** No

**Transportation of Radioactive Materials (H-308S)**

The Transportation of Radioactive Material Self-Study Course (H-308S) is a comprehensive course that covers all the major topics contained in the Department of Transportation Hazardous Materials Regulations pertaining to the transportation of radioactive material. The course is designed to familiarize the student with 49 CFR Parts 100 to 177. This online course involves self-paced study of 11 eLearning instructional modules (titles provided below). These course modules were developed based on a 40-hour instructor-led course. So schedule and allot your time accordingly when starting this course. Module 11, Packaging Exercises, have been developed based on classroom scenarios that were presented during the instructor-led offerings. These so-called packaging exercises are instrumental in gaining a practical understanding of applying the DOT regulations to everyday situations. These exercises are optional for those not taking the course for qualification purposes. However, it is strongly recommended that these scenarios be reviewed in order to enhance your understanding of the regulations. Upon completion of the self-study modules, those taking the course for qualification purposes or otherwise those who want credit for the course are required to take the online exam. An exam grade of ≥70% is required to receive credit for the course.

Module Titles:
1. Introduction to Transportation Regulations and Regulatory Agencies
2. SI Units
3. Hazardous Material, Hazardous Substances, Reportable Quantity, and Radioactive Material
4. Radionuclide A1 and A2 Values
5. DOT Radioactive material Shipping Categories
6. Radiation and Contamination Limits
7. Hazardous Material Communication Requirements – Part I
8. Hazardous Material Communication Requirements - Part II
9. Packaging
10. Inspection Focus Areas
11. Packaging Exercises

**Exam:** Multiple choice - 70% passing
**Mobile:** NA

**Internal Dosimetry (H-312S)**

This course involves self-paced study of 21 eLearning instructional modules and an online exam (70% required to receive credit for the course).

The Internal Dosimetry Self-Study course will provide you with an understanding of current methods for determining radiation doses resulting from intakes of radioactive materials. Topics that are covered in the course include: basic concepts and principles of internal dose assessments, the ICRP internal dosimetry systems and models currently used in the U.S. and internationally, bioassay methods and interpretation, regulatory compliance and guidance, and quality assurance methods for internal dosimetry programs. Throughout the course, you will be presented with detailed example problems covering all aspects of internal dose assessment. At the end of each module, you will also be provided with knowledge check questions and solutions to help you prepare for the course exam.

The modules included in the online course are listed below:
Module 1 - Introduction to Internal Dosimetry (Part I)
Module 2 - Introduction to Internal Dosimetry (Part II)
Module 3 - Introduction to Internal Dosimetry (Part III)
Module 4 - Evolution of Internal Dosimetry Systems
Module 5 - Modeling Internal Dosimetry
Module 6 - Intake Models for Inhalation

Module 7 - Intake Models for Ingestion
Module 8 - Intake Models for Wounds
Module 9 - ICRP Systemic Models
Module 10 - Dosimetry Models
Module 11 - Bioassay Programs
Module 12 - Bioassay Interpretation
Module 13 - Air Sampling in the Workplace for Internal Dosimetry
Module 14 - Internal Dosimetry at Nuclear Power Plants
Module 15 - Internal Dosimetry at Uranium Facilities
Module 16 - Radon Issues at Uranium Facilities
Module 17 - Internal Dosimetry at Research and Medical Facilities
Module 18 - Internal Dosimetry for the Embryo/Fetus
Module 19 - Treatment for Internal Contamination
Module 20 - NRC Regulations and Guidance for Internal Dosimetry
Module 21 - Inspection of Internal Dosimetry Programs

**Exam:** Multiple choice - 70% passing
**Mobile:** NA

**Safety Aspects of Well Logging (H-314)**

******Notice*** This course is on hold until a new contract has been awarded. Course sessions will be scheduled with the new contractor ASAP. It is expected that the next session will be scheduled in early CY2023.***

This 4.5-day course provides an understanding of the principles of well logging in the gas and oil industry. NRC regulations and inspection procedures, well logging equipment and operations, procedures related to retrieval of lost sources and irretrievable sources are also covered. Itinerary TBD, but past course sessions have included visiting a full-scale training well site, watching a demonstration of source (dummy) changeout, touring a contractor's manufacturing facility and source recovery facility, and visiting two museums.

**Exam:** Multiple choice - 70% passing
**Mobile:** No

**Irradiator Technology (H-315)**

This 3-day course provides an understanding of the basic operation of industrial irradiators, including all safety systems and regulatory requirements; cobalt-60 source loading; safety checks; audits and self-inspection items; equipment; control room and irradiator maintenance; radiation safety officer and operator responsibilities; wipe tests and radiation surveys; emergency procedures; commercial applications; and dosimetry. A day-long tour of an operational pool-type industrial irradiator is conducted. The tour will include hands-on activities such as radiation surveys and trip/reset of multiple interlocks.

The classroom portions of this course are held at the NRC Region IV office.

**Start time each day of the course is 8:00 AM Central Time (9:00 AM ET).** Start time may be adjusted by the instructors for the day of onsite training and observation at a nearby irradiator facility.

Transportation is provided to and from the Region IV office to the irradiator facility.

**Exam:** Multiple choice - 70% passing
**Mobile:** No

**Medical Uses of Radiation Self-Study (H-317S)**

This course is the result of merging and converting to a single online course the Nuclear Medicine (H-304) course and the Brachytherapy (H-313) course. As such, completion of H-317S is equivalent to the completion of the H-304 and H-313 courses. H-317S is intended to give a clinical perspective of the different nuclear medicine technologies and medical treatments that are licensed by the NRC and Agreement States. The course includes the following content:

Module 1: Introduction to Medical Uses of Radiation
Module 2: Radiopharmaceuticals
Module 3: The Radiopharmacy
Module 4: Diagnostic Nuclear Medicine Instrumentation I
Module 5: Diagnostic Nuclear Medicine Instrumentation II
Module 6: Diagnostic Nuclear Medicine Procedures
Module 7: Therapeutic Nuclear Medicine Procedures
Module 8: Radiation Safety in the Nuclear Medicine Department
Module 9: Management of Radioactive Patients
Module 10: Medical Events and Other Unplanned Exposures
Module 11: Inspection Procedures in Nuclear Medicine
Module 12: Introduction to Radiation Oncology
Module 13: Principles of Brachytherapy
Module 14: Radiation Dosimetry in Brachytherapy
Module 15: High Dose Rate Brachytherapy
Module 16: Permanent Implant Brachytherapy
Module 17: Other Brachytherapy Techniques
Module 18: Accelerator-Based Radiation Oncology
Module 19: Teletherapy-Based Radiation Oncology
Module 20: Clinical Radiation Safety in Radiation Oncology
Module 21: Written Directives and Medical Events in Radiation Oncology
Module 22: Inspection Procedures in Radiation Oncology

The course also contains the following demonstrations:

Demonstration 1: Tour of the Radiopharmacy
Demonstration 2: Operation and QC of a Radionuclide Generator
Demonstration 3: Dose Calibrator QC
Demonstration 4: Dose Calculations and Dispensing
Demonstration 5: Tour of the Nuclear Medicine Department
Demonstration 6: Well Counter QC
Demonstration 7: Imaging Device QC
Demonstration 8: Tour of the HDR Suite
Demonstration 9: Tour of the Gamma Knife® Facility

**Exam:**
**Mobile:** No

**RESRAD OVERVIEW (H-408)**

***IMPORTANT***

This course is currently only being presented via a virtual classroom. As such, additional information (e.g., access to course materials, links to sessions, etc.) will be sent to enrollees approximately 1-2 weeks before the course session by either the Course Director or the instructor(s).

This 4.5-day course provides students with an overview of the RESRAD suite of codes, including the history of the codes, their calculation methodology, input parameter requirements, and regulatory applications (emphasis on RESRAD and RESRAD-OFFSITE). This is a computer-based course and students will be provided opportunities to use the RESRAD codes throughout the course. During the week, air and groundwater transport models used by the codes will be discussed in detail, as well as the off-site accumulation of radionuclides in soils and surface water bodies. The deterministic and probabilistic dose analysis techniques built into the codes will also be covered in detail, as well as special features of the codes, such as sensitivity analysis. Interactive computer demonstrations will guide the participants through data input and output steps. Instructor support will help the students complete the hands-on problem-solving sessions throughout the course.

NOTE: This course combines two shorter courses: RESRAD (H-410) and RESRAD-Offsite (H-411).

**Exam:** No formal exam is proctored, but instructors facilitate guided exercises using the software and provide feedback to students. As such, instructors determine if an enrollee successfully completes the course.
**Mobile:** NA

**Advanced RESRAD Training Workshop (H-412)**

***IMPORTANT***
This course is only being presented virtually. As such, additional information (e.g., access to course materials, links to course sessions, etc.) will be sent to enrollees 1-2 weeks before the session begins by the Course Director and/or the instructor(s).

This course is a 2.5-day workshop that will provide in-depth training on the RESRAD computer code. The majority of the workshop will focus on realistic D and D scenarios for a variety of facility types and sites, including actual D and D experiences for NRC licensed facilities. Interactive computer demonstrations will guide the participants through data input and output steps. Instructors will help the students complete the hands-on problem solving sessions throughout the workshop.

***IMPORTANT*** It is recommended that attendees first take the RESRAD Overview Course (H-408) or have some previous experience with the RESRAD computer code before taking this advanced course.

Note: This course is typically only being offered once every other year.

**Exam:** No formal exam is proctored, but instructors facilitate guided exercises using the software and provide feedback to students. As such, instructors determine if an enrollee successfully completes the course.
**Mobile:** NA

**MILDOS-Area Training Workshop (H-413)**

***IMPORTANT***
This course is only being presented virtually. As such, additional information (e.g., access to course materials, links to virtual sessions, etc.) will be sent to enrollees by the Course Director and/or the course instructor(s) approximately 1-2 weeks before the session begins.

This 2.5-day course includes the parameters, methods, and calculations required to determine source term values for uranium mining, milling, and in situ recovery (ISR) operations (wellfield, satellite, and processing facility operations). The course will enable participants to understand the operating parameters needed to calculate a source term using the MILDOS-AREA computer code. In addition, participants will learn to use the MILDOS-AREA code to determine doses to individuals and demonstrate compliance with 10 CFR 20.1301. Discussions and demonstrations will include using

the MILDOSE-AREA code to determine the location of highest predicted airborne radionuclide concentration as specified in Regulatory Guide 4.14 for environmental monitoring sampler placement. Interactive computer demonstrations will guide the participants through data input and output steps using the code, and instructors will assist participants in completing hands-on problem solving sessions throughout the workshop.

Note: This course is only being offered once every other year.

**Exam:** No formal exam is proctored, but instructors facilitate guided exercises using the software and provide feedback to students. As such, instructors determine if an enrollee successfully completes the course.
**Mobile:** NA

**Visual Sampling Plan (H-500)**

This course is designed to train personnel on the use of the Visual Sample Plan (VSP) software. VSP is a computer code developed by Pacific Northwest National Laboratory that is used to create sample plans for hard-to-detect nuclides at decommissioning and soil remediation projects. The first half of the course is a basic introduction to the software interface, while the last half is focused on more advanced features and topics. There is no exam for this course, but students must complete several data-input exercises and scenarios using the code.

**Exam:** No
**Mobile:** Yes

**NRC Materials Control & Security System & Principles (S-201)**

This course serves to provide attendees with a basic understanding of physical protection systems and the NRC's security requirements for materials licensees that are authorized to possess risk significant quantities of radioactive materials. This course provides instruction on a performance-based methodology to evaluate and assess the adequacy of a physical protection system to protect against theft, sabotage or diversion of risk significant quantities of radioactive materials. The course provides participants with the security competencies necessary to function in their security discipline. Training will include, but is not limited to, the following subjects: malicious uses of radioactive materials, introduction to physical protection systems and identification of critical components of a physical protective system for detection, target identification, interior and exterior intrusion detection sensors, security lighting, access control systems, barriers, locking systems, and response forces. The course is 5 days in length with a written exam, open book. Technical assistance is provided by Sandia National Laboratories (SNL) and Certified Health Physicist NRC inspectors.

**Exam:** Multiple choice - 70% passing
**Mobile:** No